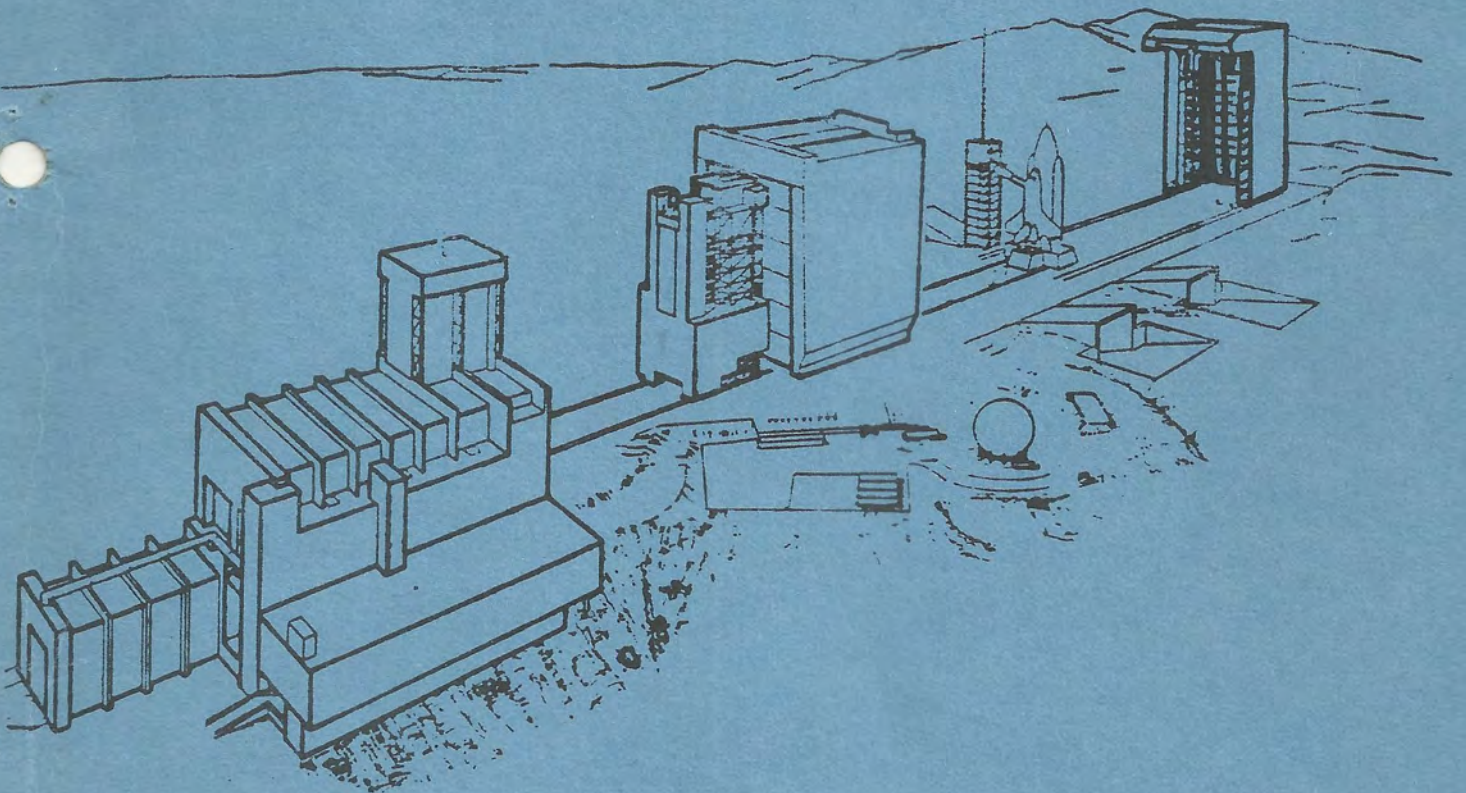


GSS Project Familiarization Course

**DOD STS
Ground Support
Systems
Integration**



MARTIN MARIETTA

GSS FAMILIARIZATION COURSE

OP-101-MMV

THIS DOCUMENT IS
FOR TRAINING PURPOSES ONLY
AND
DISTRIBUTION OF FUTURE
UPDATES WILL NOT BE MADE.

REVISION 16

Space Shuttle Operational Profile



ET SEP JUST PRIOR TO ORBIT INSERTION
NOMINAL, MAIN ENGINE CUTOFF, 59 NM
(68 MILES) NOMINAL VELOCITY 7796
METERS PER SEC (25,581 FPS, 17,440 MPH)
APPROX 8 MIN FIRING



SRB SEP AT 24 NM (28 MILES)
NOMINAL VELOCITY, 1383 METERS
PER SEC (4,538 FPS, 3,094 MPH) APPROX
2 MIN FIRING



**SHUTTLE LAUNCH MAX DYNAMIC
PRESSURE NOMINALLY AT 10,241
METERS (33,600 FT) AT APPROX
60 SEC**



ORBIT INSERTION AND CIRCULARIZATION VARIABLE DUE TO MISSIONS AS TO FIRING TIME



EARTH ORBIT OPERATIONS
DURATION; NOMINAL 7 - 30
DAYS, 100 TO 600 NM (115 TO
690 MILES), VELOCITY 7743
METERS PER SEC (25,405 FPS,
17,321 MPH)



DEORBIT VELOCITY DECREASE,
NOMINAL 91 METERS PER SEC
(300 FPS, 204 MPH) FROM EARTH
ORBIT OPERATIONS

SHUTTLE FACTS (weights approximate)

LENGTH

SYSTEM: 56.14 m (184.2 ft)
ORBITER: 37.24 m (122.2 ft)

HEIGHT

SYSTEM: 23.34 m (76.6 ft)
ORBITER: 17.27 m (56.67 ft)

WINGSPAN

ORBITER: 23.79 m (78.06 ft)

WEIGHT

GROSS LIFTOFF:
2,041,200 kg (4.5 million lb)
ORBITER LANDING
with payload 96,163 kg (212,000 lbs)

THRUST

SOLID ROCKET BOOSTERS (SRB) (2):
12,899,200 newtons (2.9 million lb)
of thrust each at sea level
ORBITER MAIN ENGINES (3):
1,668,000 newtons (375 thousand lb)
of thrust each at sea level

CARGO BAY

DIMENSIONS:
18.28 m (60 ft) long, 4.57 m (15 ft)
in diameter

PAYLOADS:

Unmanned spacecraft to fully
equipped scientific laboratories



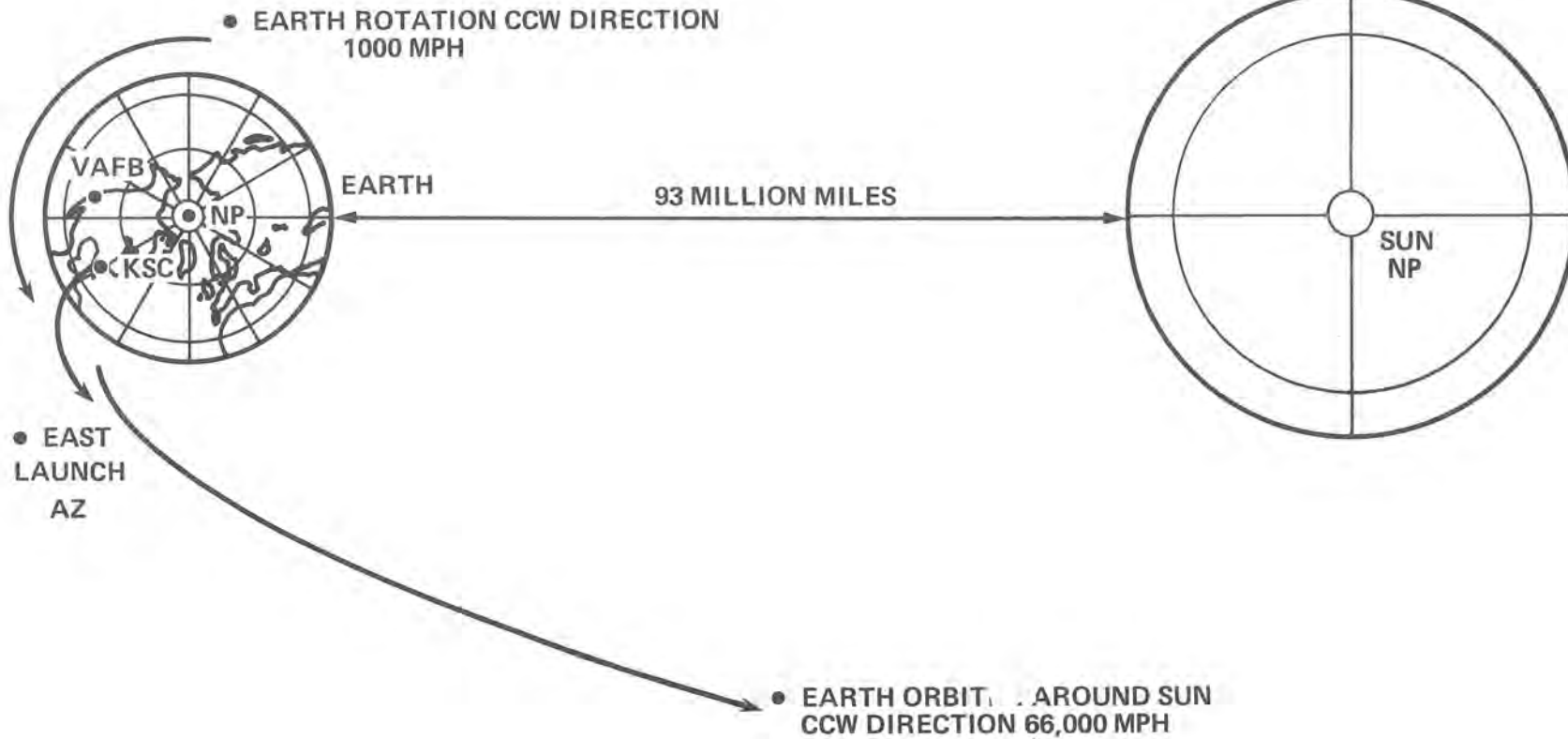
LANDING TOUCHDOWN SPEED
NOMINAL 180 KNOTS
(207 MPH)



**MAINTENANCE AND
REFURBISHMENT**

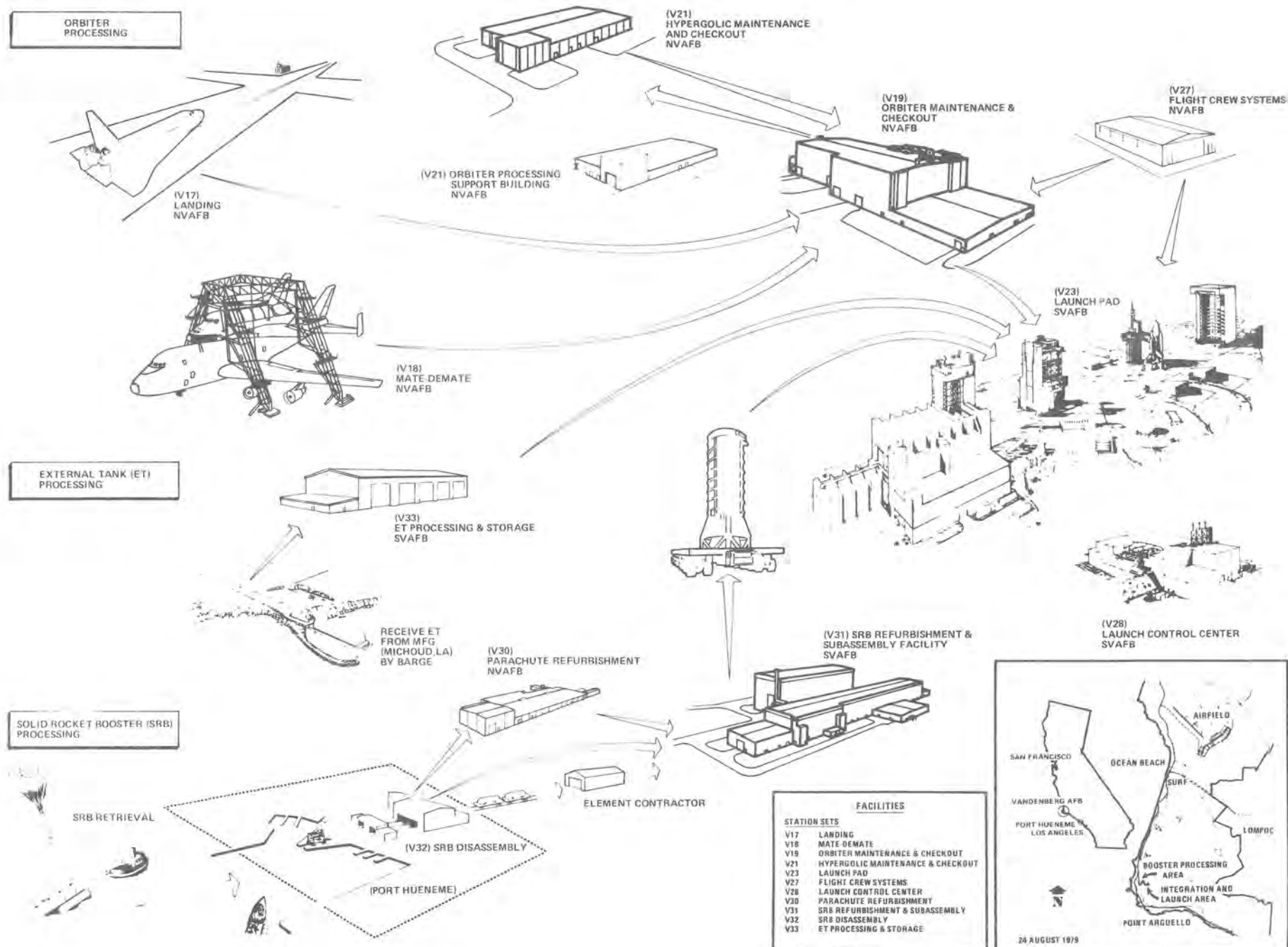
SLING SHOT EFFECT EAST LAUNCH AZ

PAYLOAD=65,000 LBS

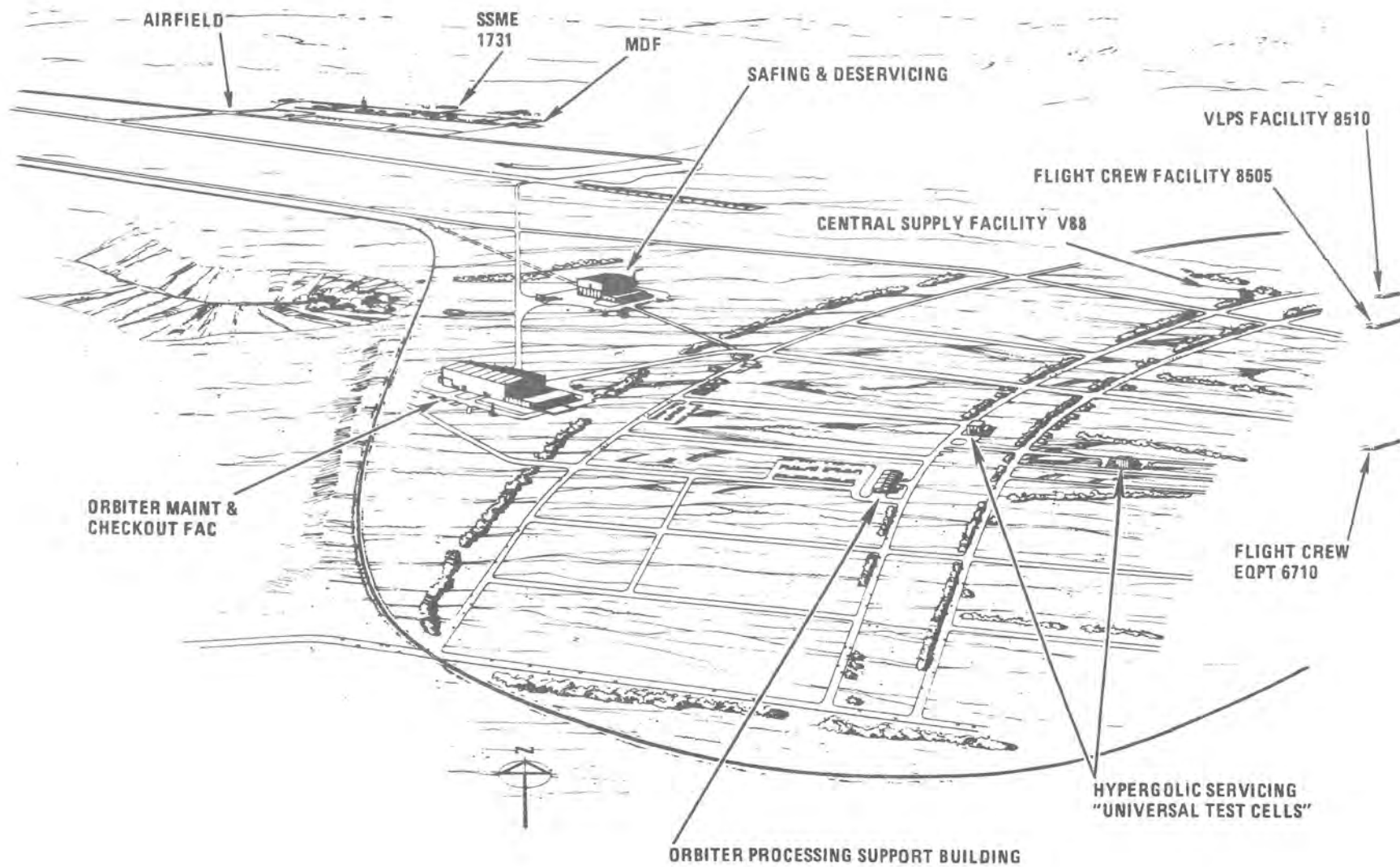


VANDENBERG SHUTTLE OPERATIONS

ONLINE AND OFFLINE PROCESSING



NORTH VANDENBERG SITING

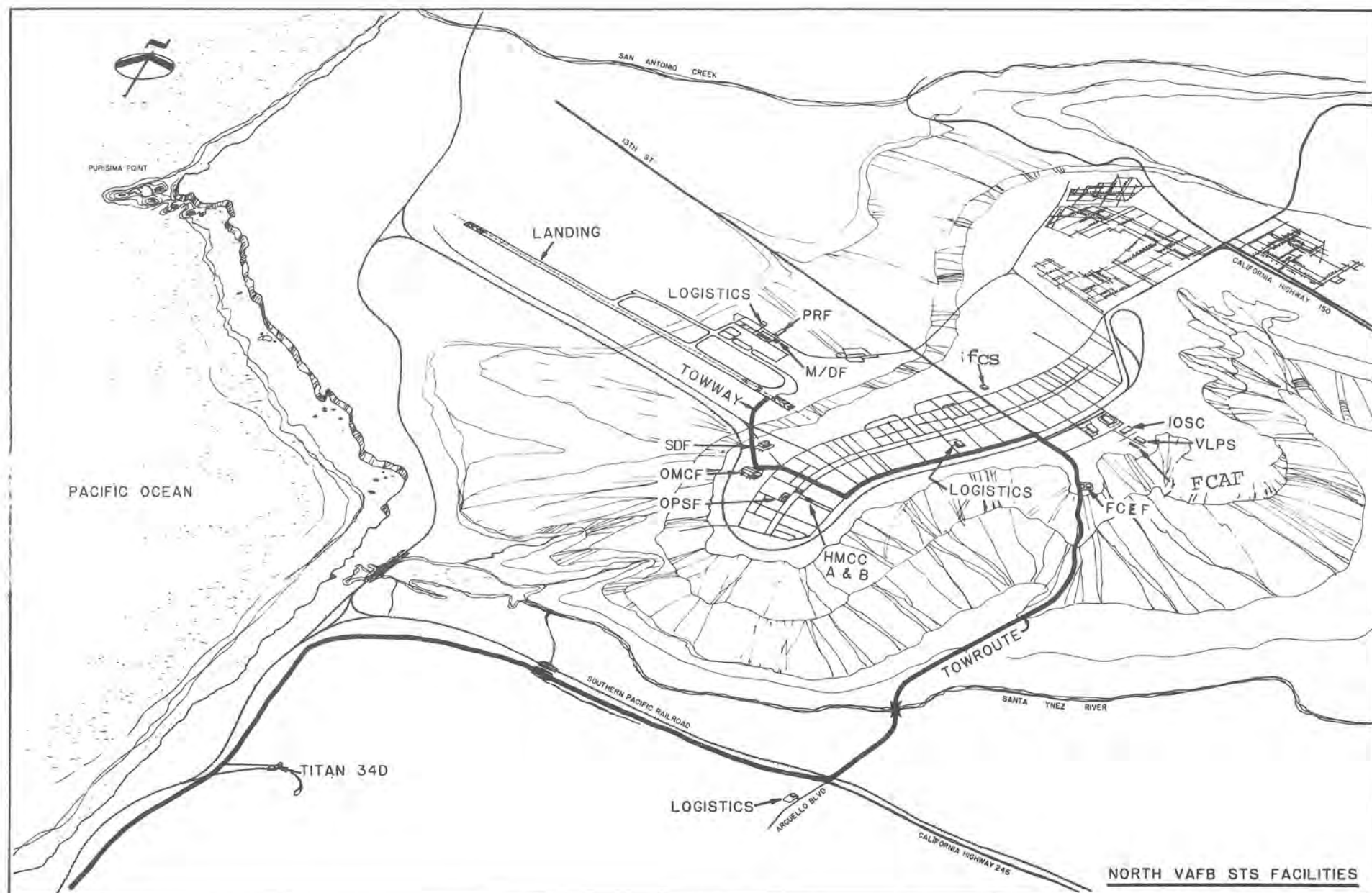


ANTI SLING SHOT EFFECT POLAR LAUNCH AZ**PAYLOAD=32,000 LBS****WITHOUT THRUST AUGMENTATION**

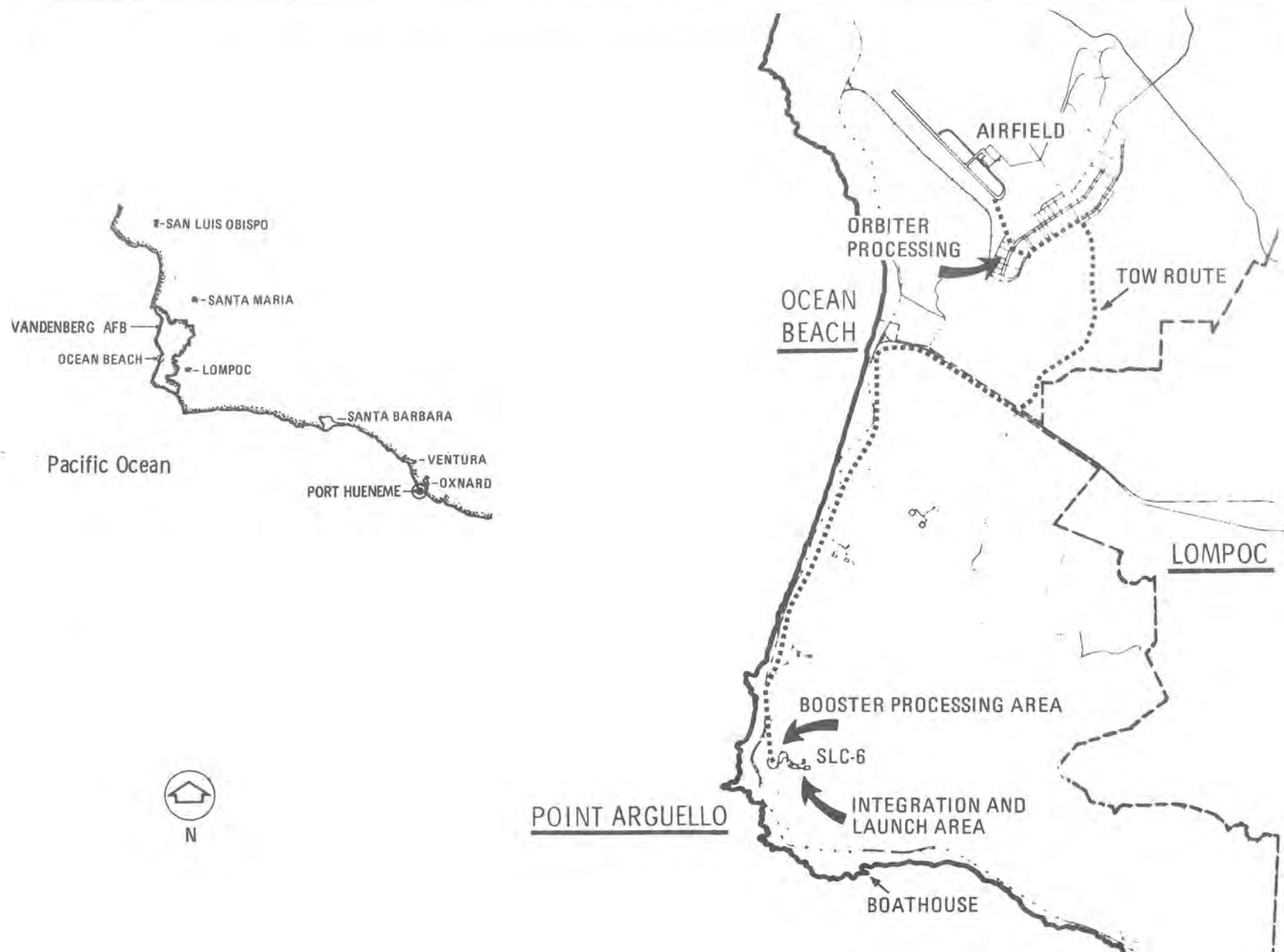
- EARTH ROTATION CCW DIRECTION
1000 MPH
- TO ESTABLISH POLAR ORBIT 1000 MPH EARTH ROTATION MUST
BE OVER COME
- DECREASE PAYLOAD WEIGHT ENABLES PROPER VELOCITY TO
BE ATTAINED WITH SAME AMOUNT OF FUEL AS EAST AZ.

VAFB GSS STATION SETS

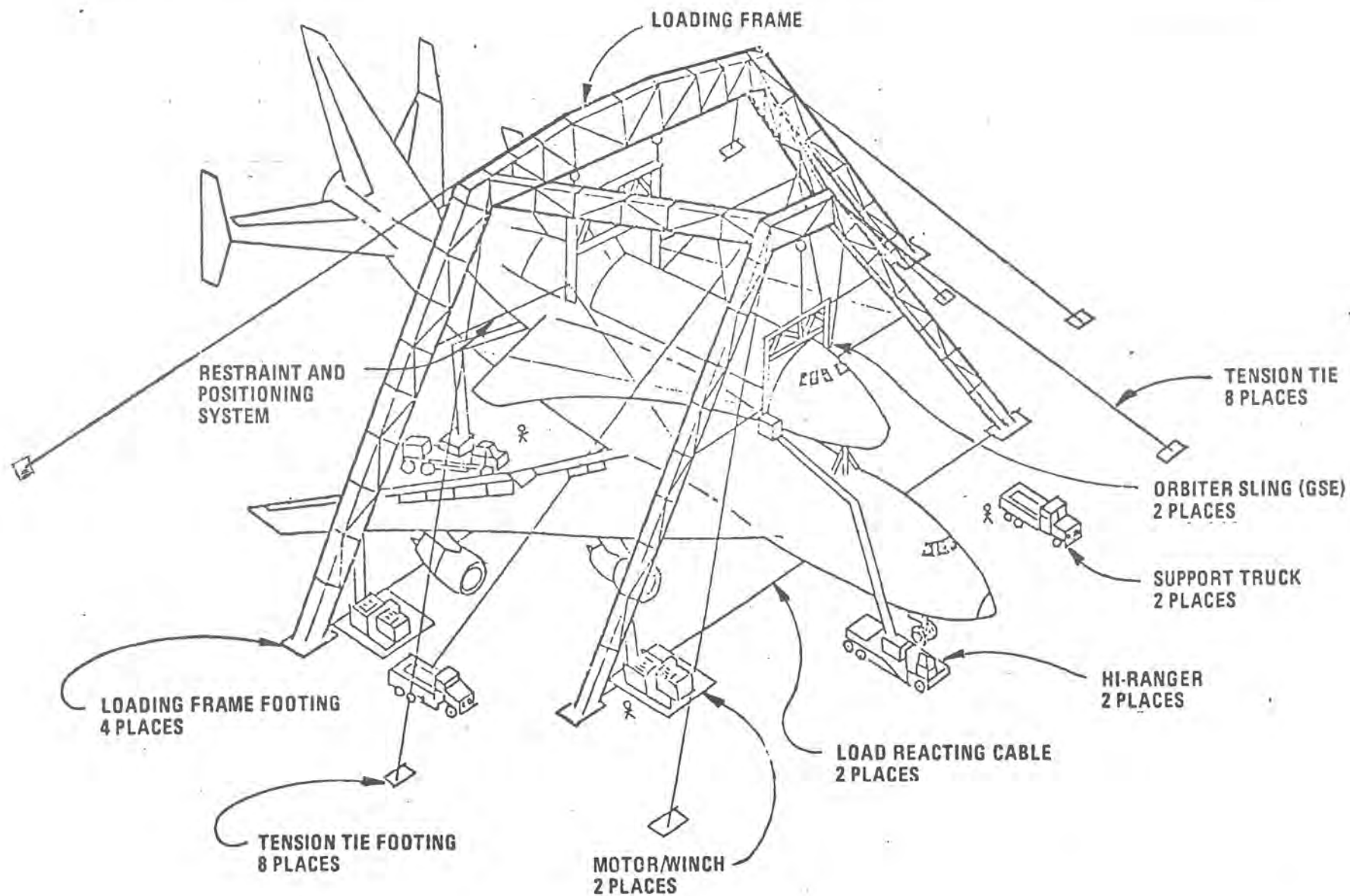
.	V17	LANDING
.	V18	MATE/DEMATE (MDF)
.	V19	ORBITER MAINTENANCE AND CHECKOUT (OMCF)
.	V19A	SAFING AND DESERVICING (SDF)
.	V21	HYPERGOLIC MAINTENANCE AND CHECKOUT (HMCF)
.	V23	LAUNCH PAD (LP)
.	V27	FLIGHT CREW SYSTEMS (FCS)
.	V28	LAUNCH CONTROL CENTER (LCC)
.	V30	PARACHUTE REFURBISHMENT (PRF)
.	V31	SRB REFURBISHMENT AND SUBASSEMBLY (SRSF)
.	V32	SRB RETRIEVAL AND DISASSEMBLY (SDAF)
.	V33	ET PROCESSING AND STORAGE (TCF)
.	V80	TRANSPORTATION
.	V81	COMMUNICATIONS
.	V84	VANDENBERG LAUNCH PROCESSING SYSTEM (VLPS)
.	V86	UTILITIES
.	V88	LOGISTICS



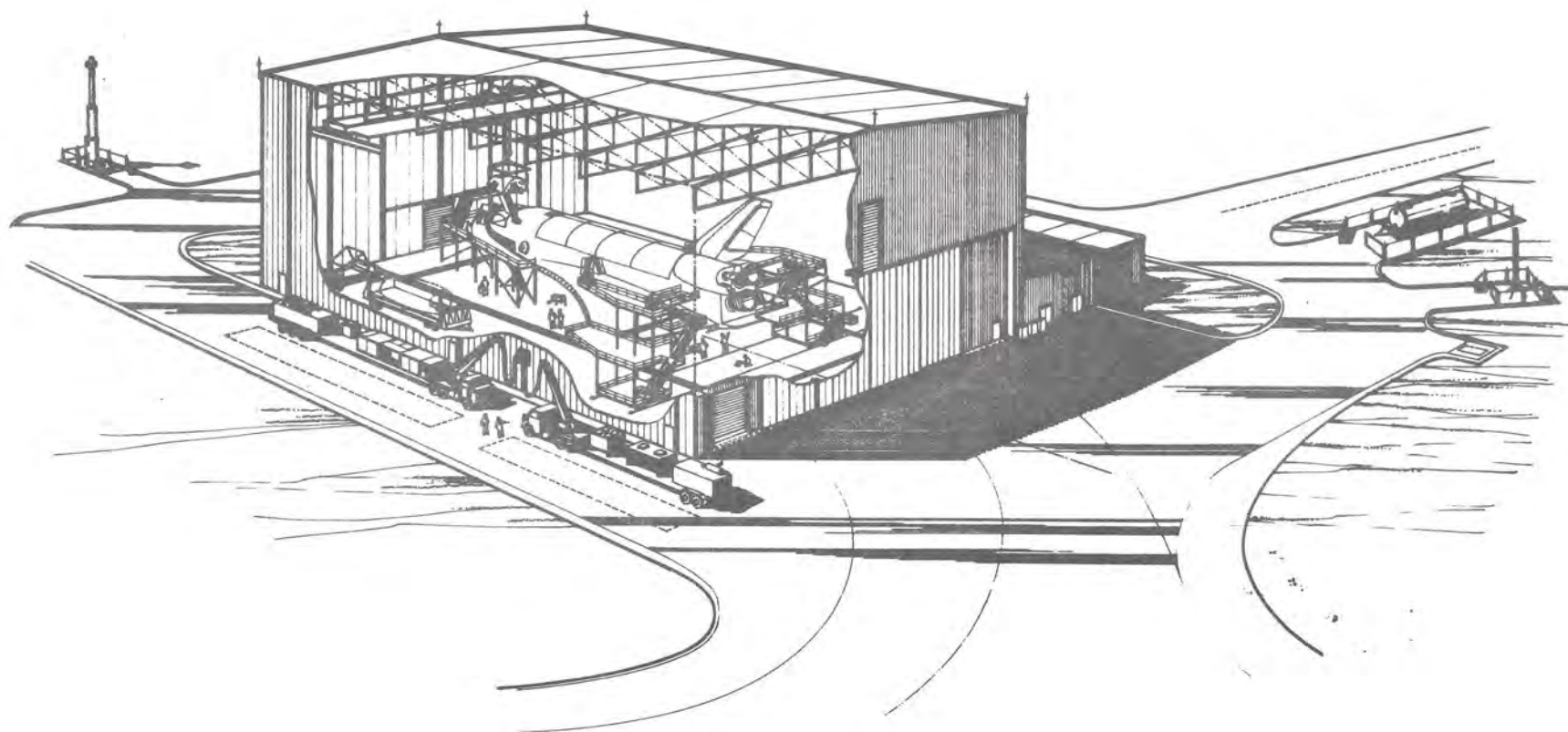
VANDENBERG AFB AND VICINITY

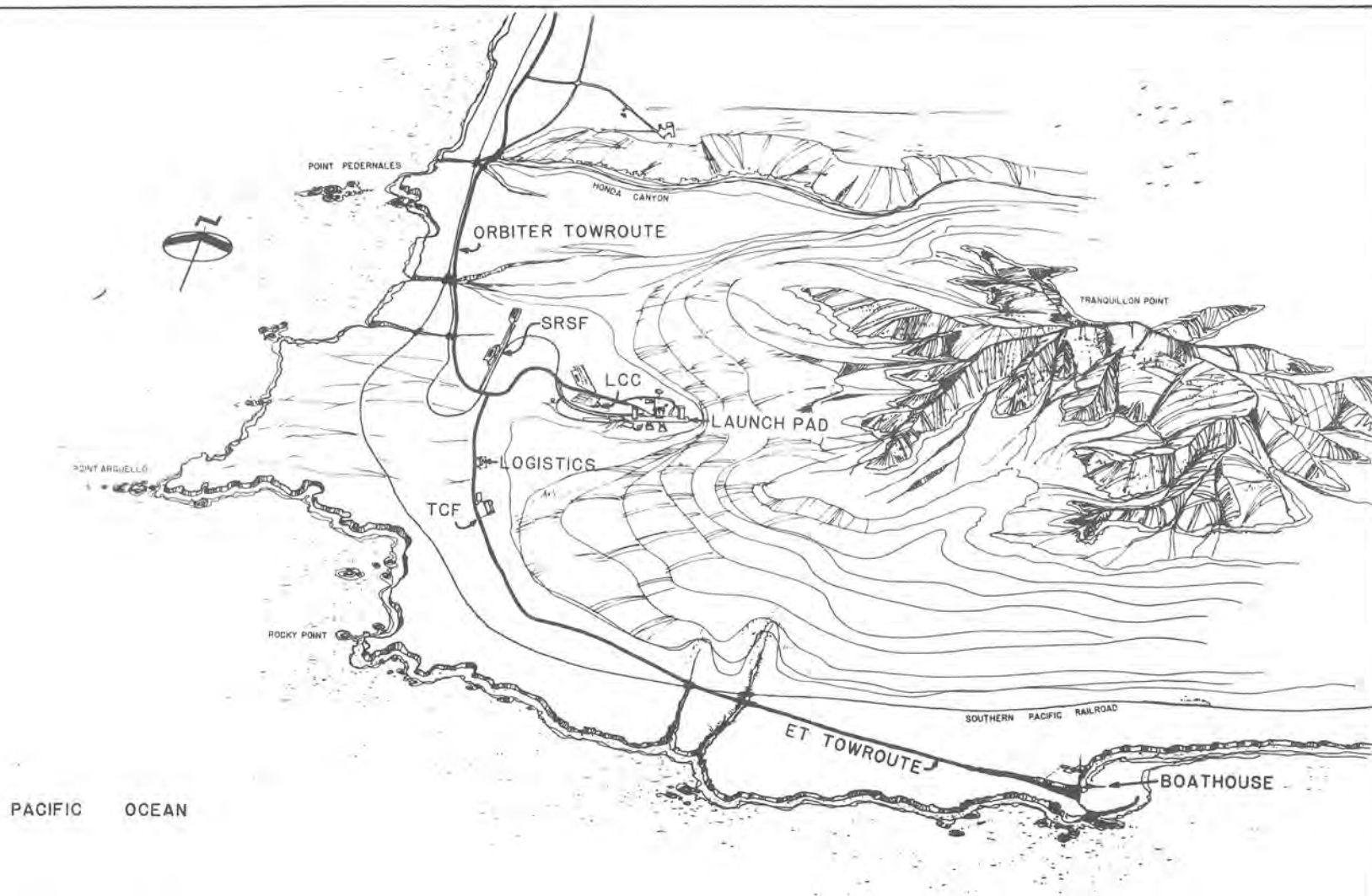


ORBITER LOADING FRAME

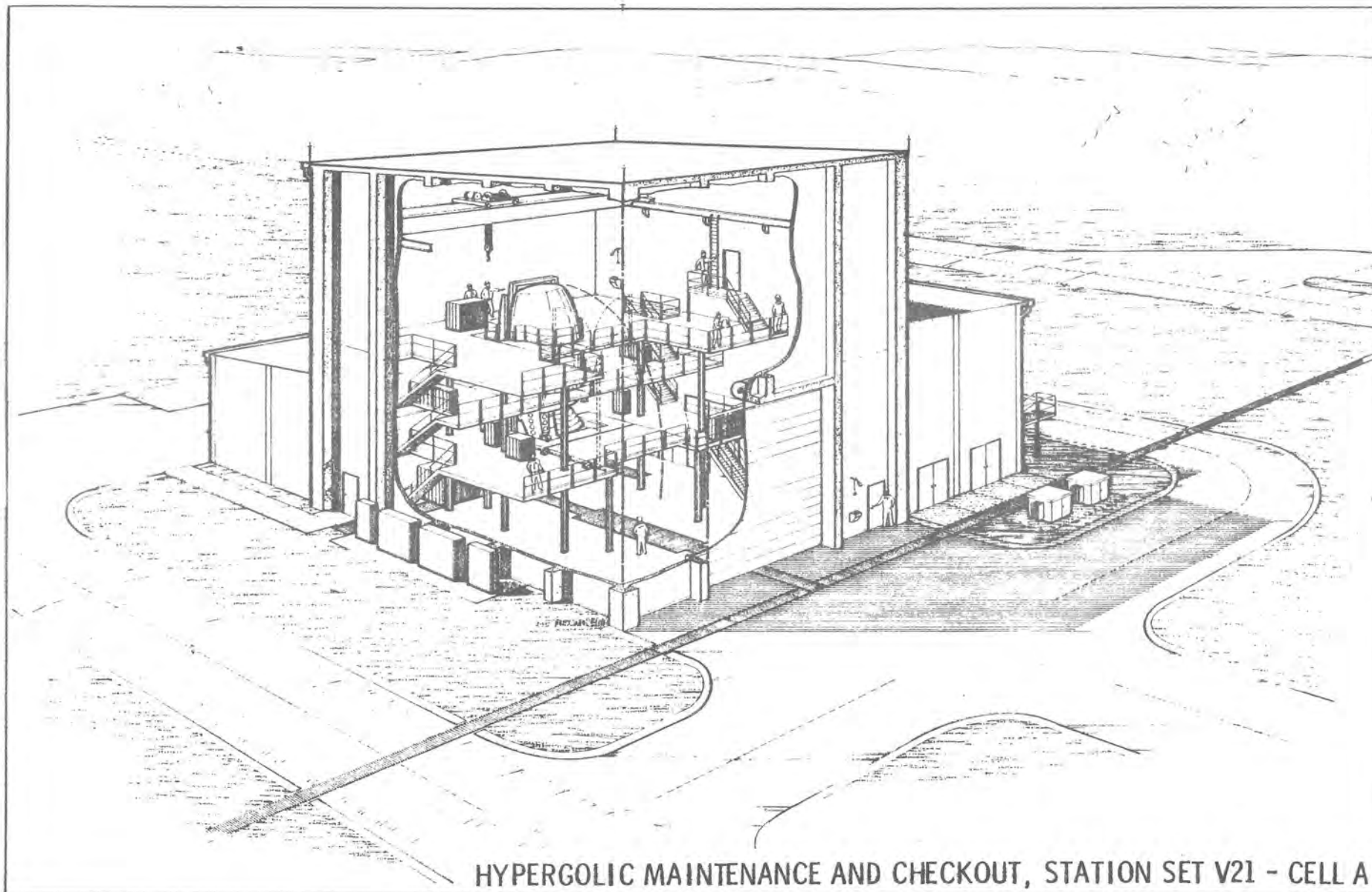


SAFING AND DESERVICING, V19A

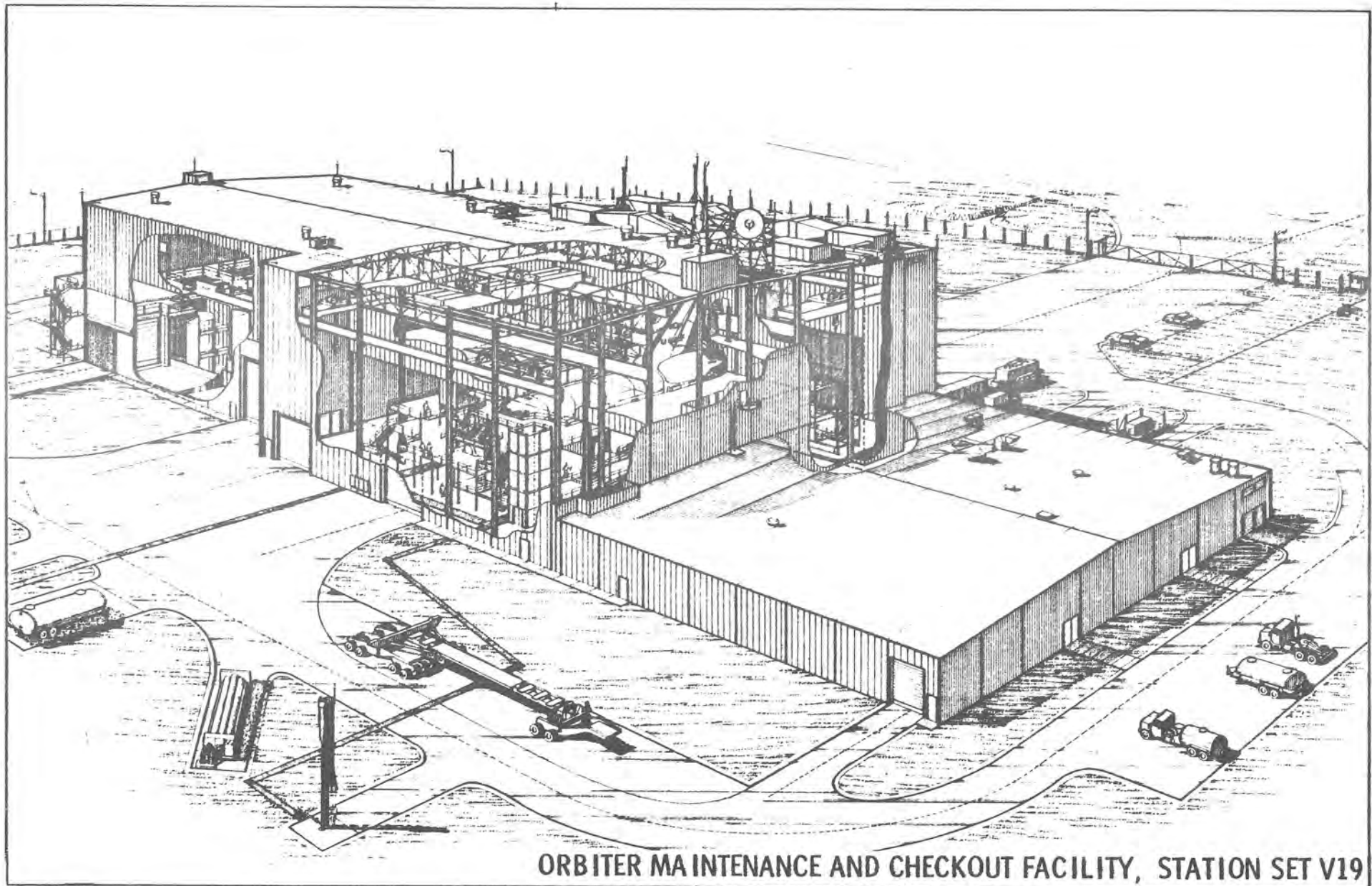




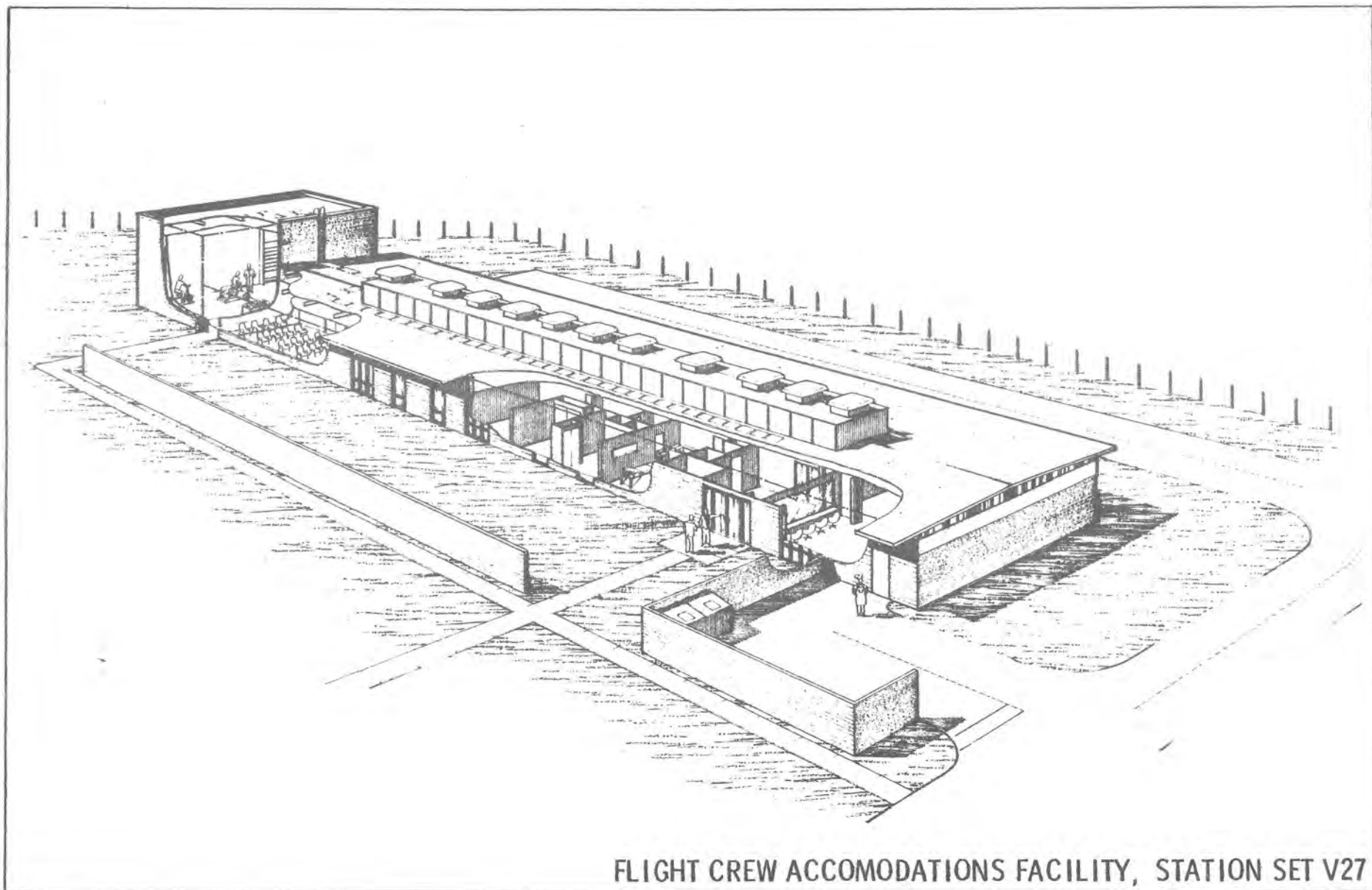
SOUTH VAFB STS FACILITIES



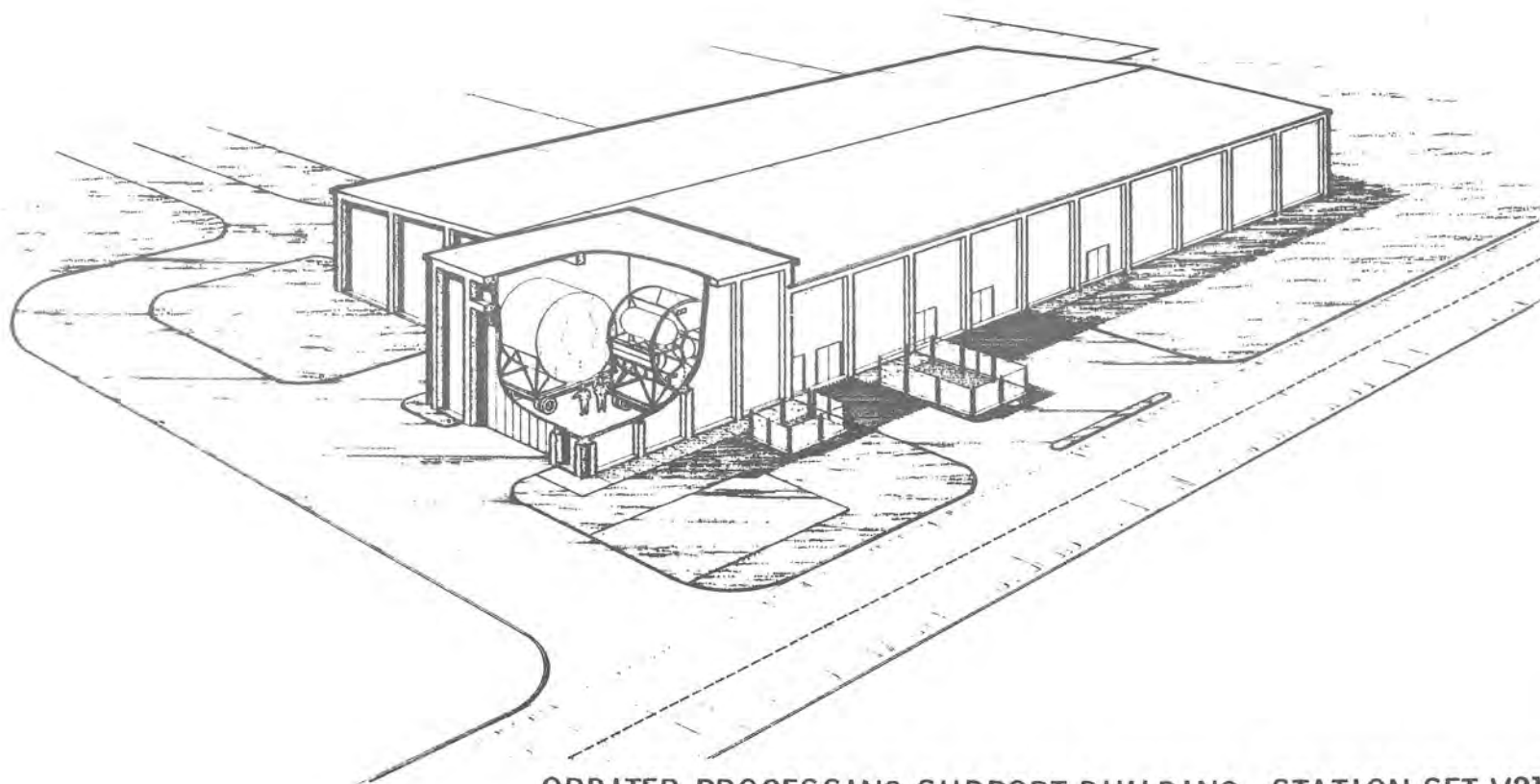
HYPERGOLIC MAINTENANCE AND CHECKOUT, STATION SET V21 - CELL A



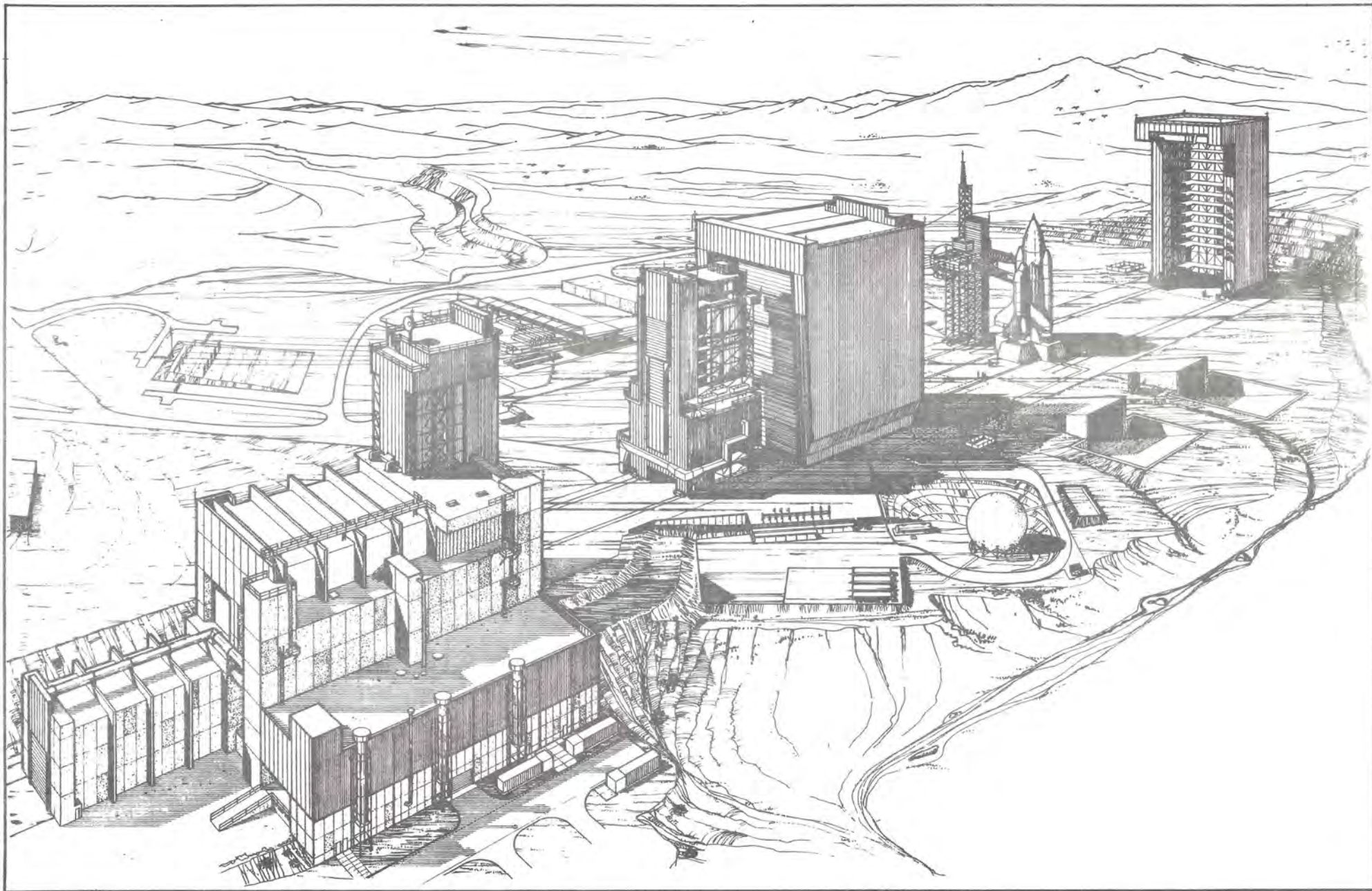
ORBITER MAINTENANCE AND CHECKOUT FACILITY, STATION SET V19

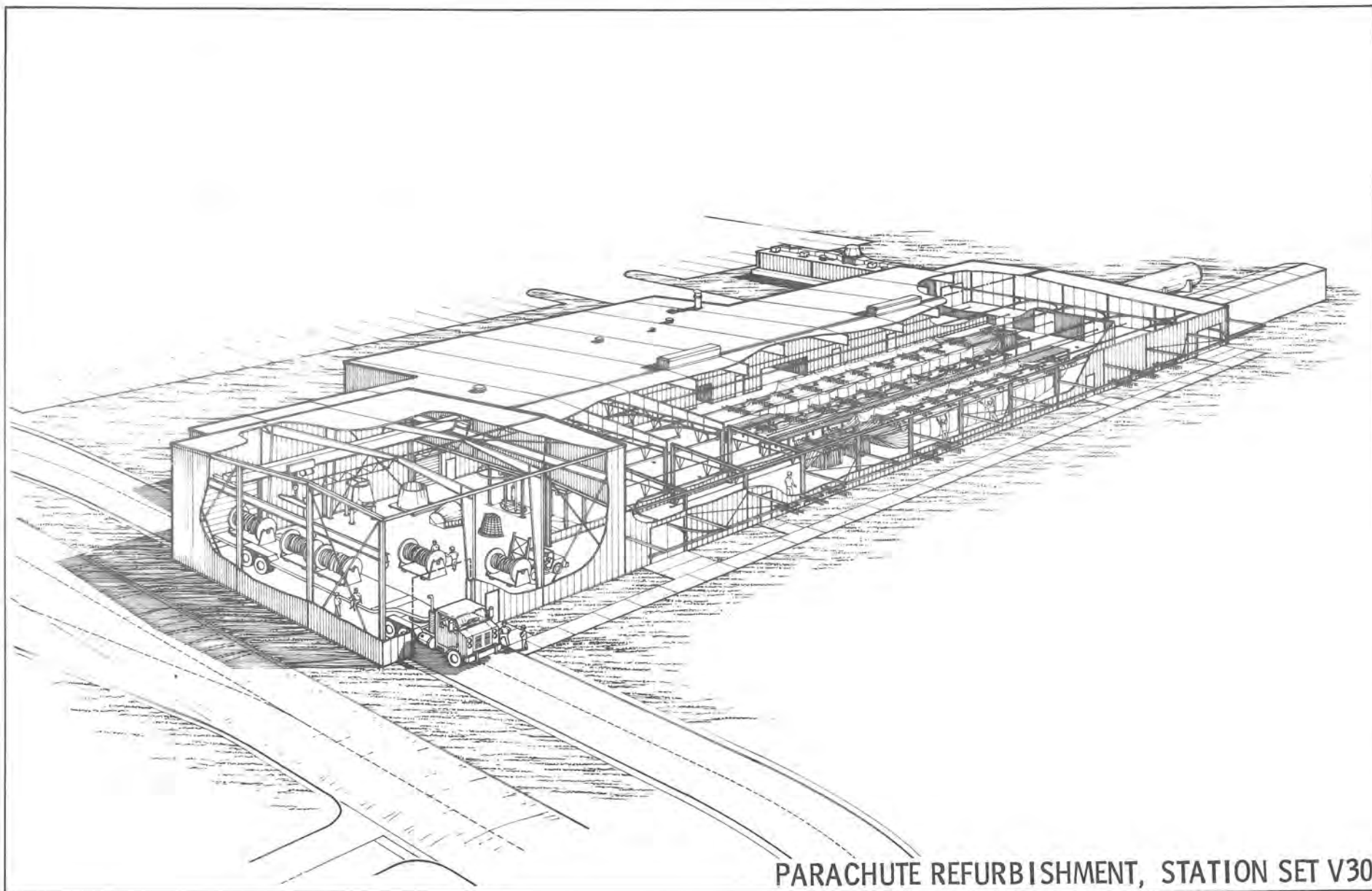


FLIGHT CREW ACCOMODATIONS FACILITY, STATION SET V27



ORBITER PROCESSING SUPPORT BUILDING, STATION SET V21

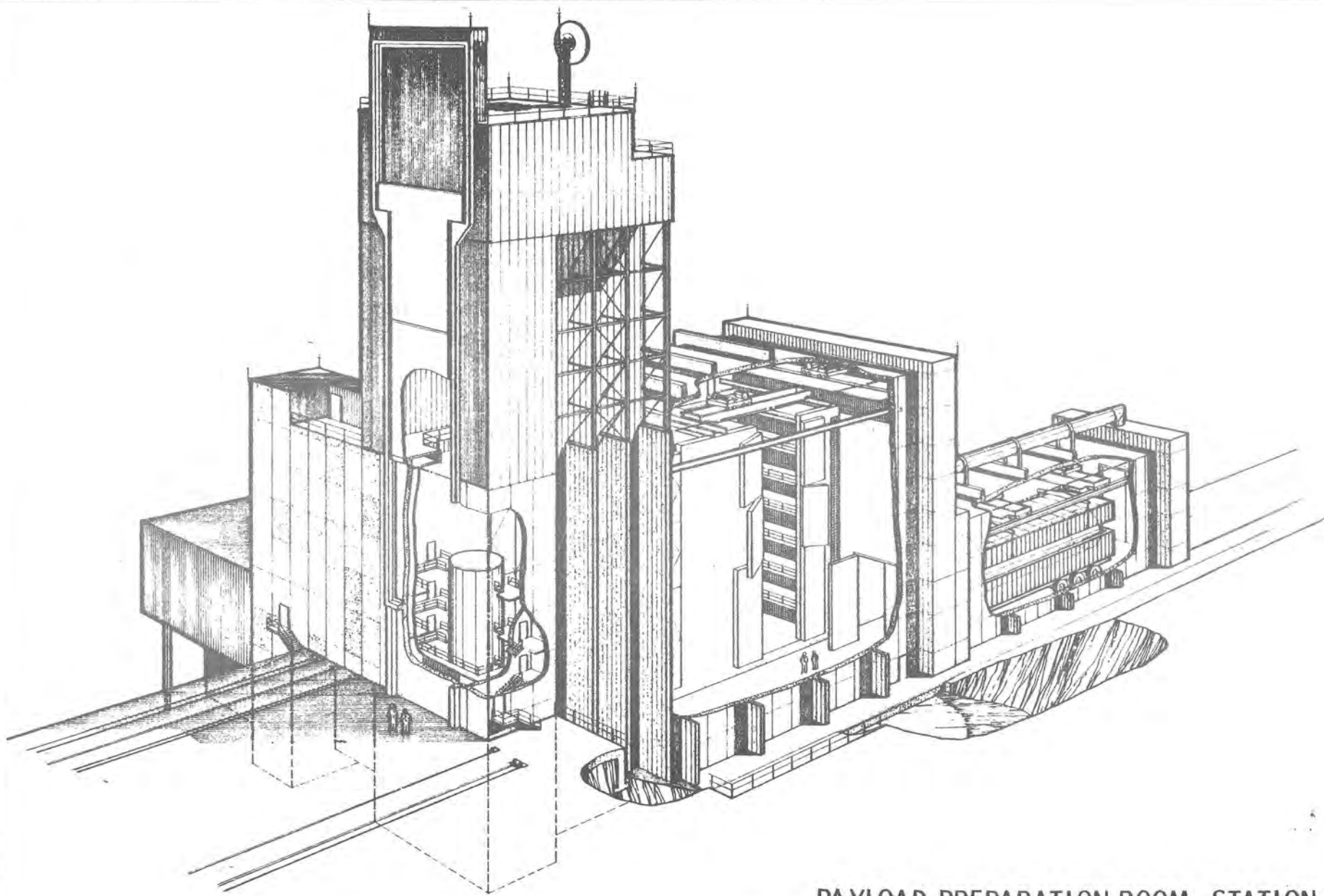




PARACHUTE REFURBISHMENT, STATION SET V30

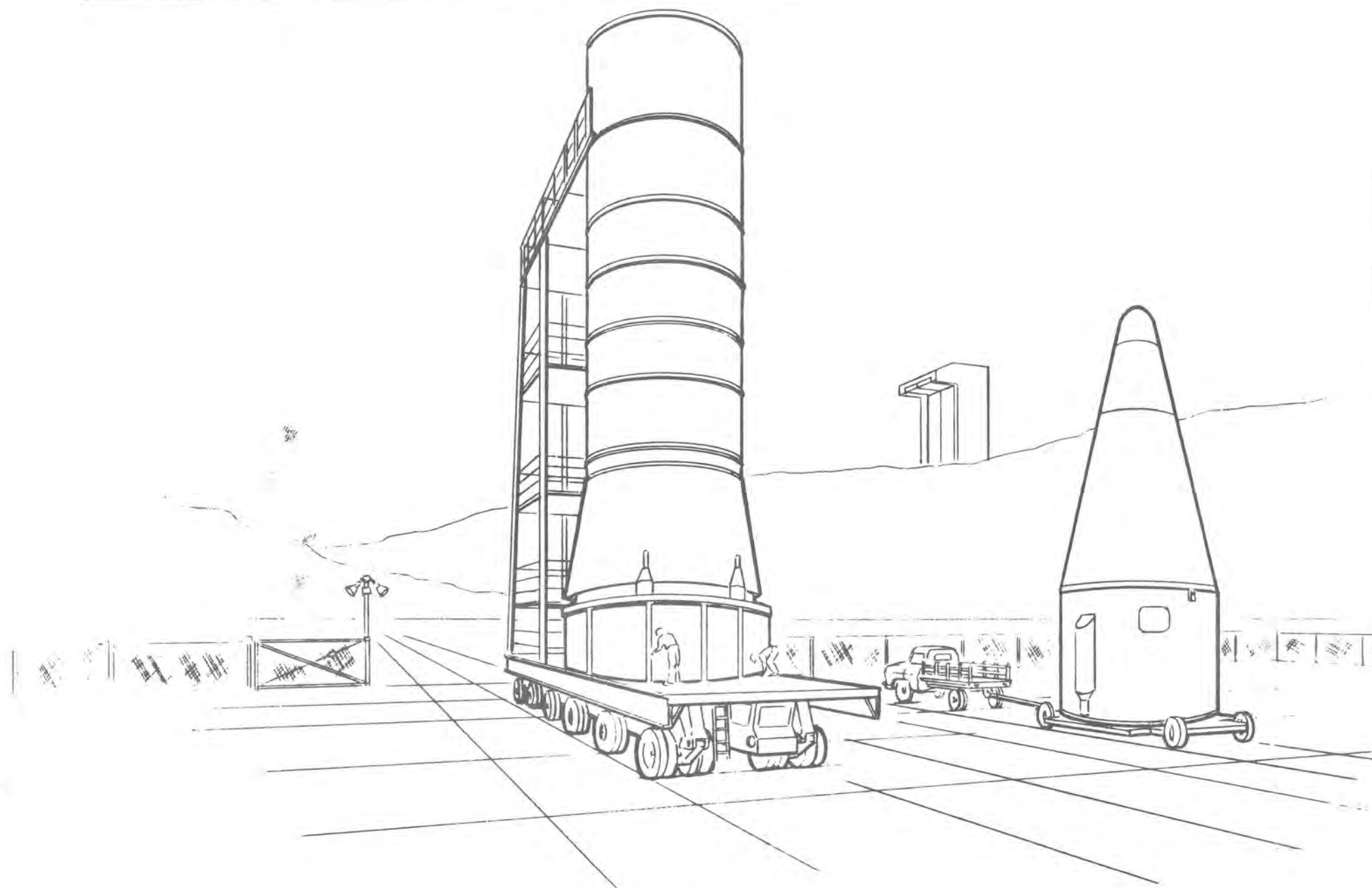


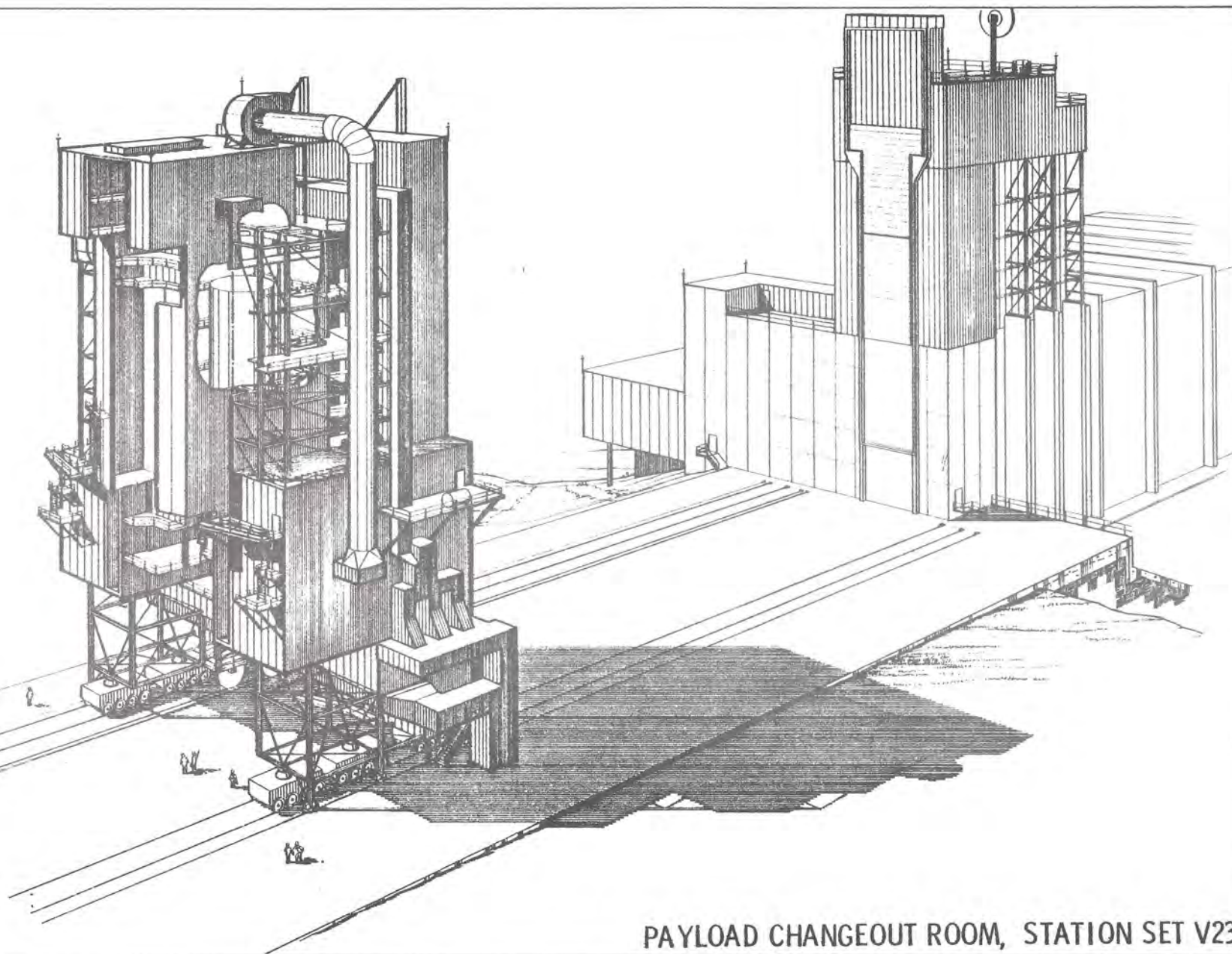
NVAFB CENTRAL SUPPLY FACILITY, STATION SET V88



PAYLOAD PREPARATION ROOM, STATION SET V23

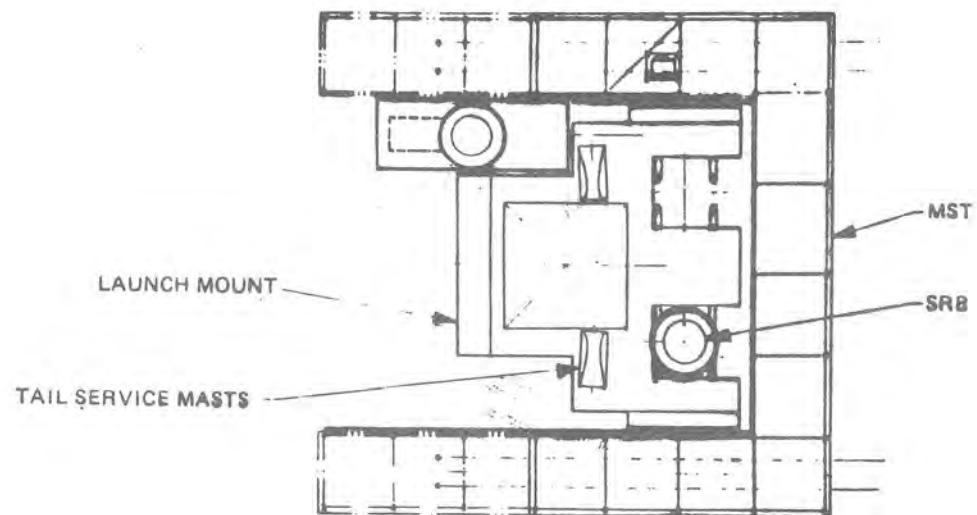
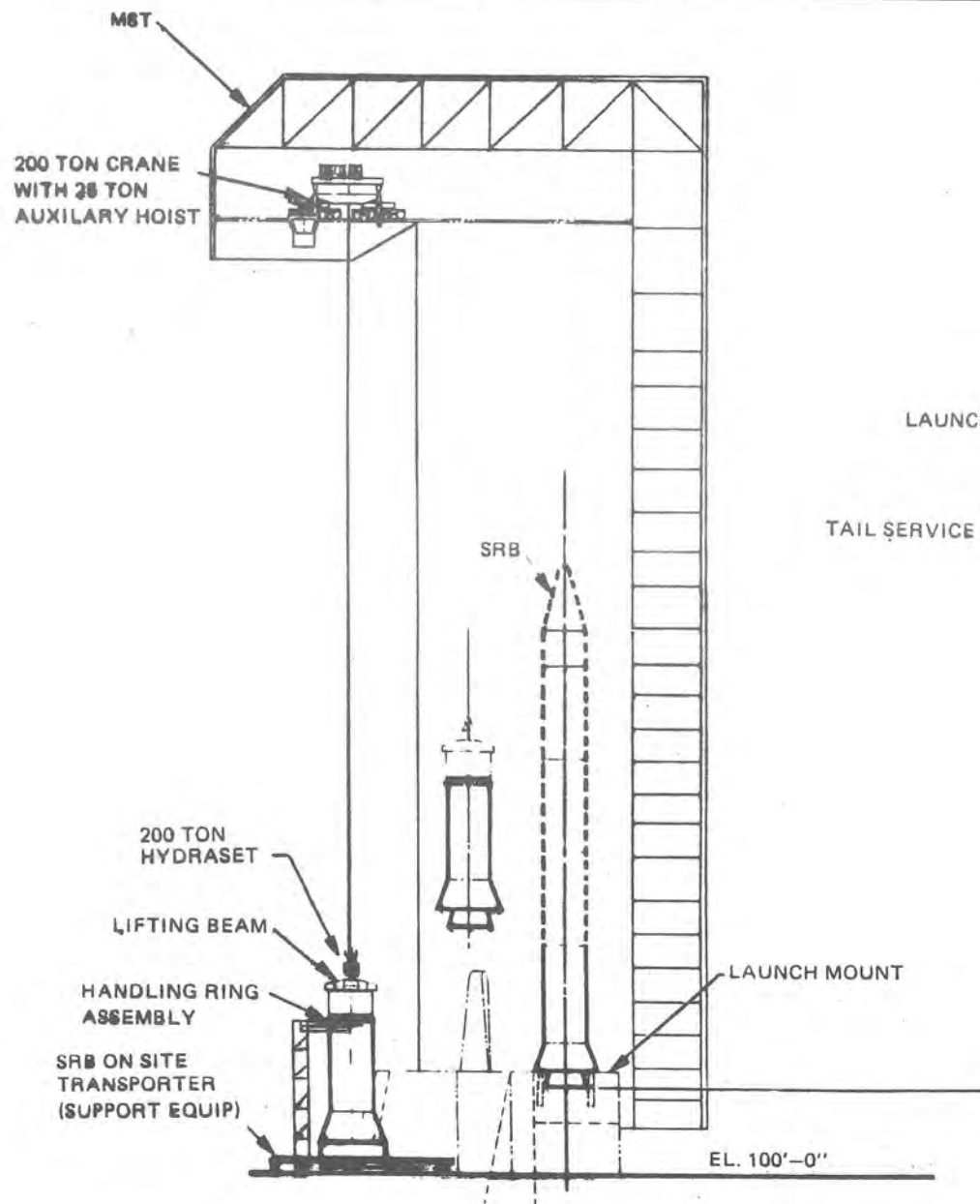
SRM BEING TRANSPORTED TO LAUNCH PAD

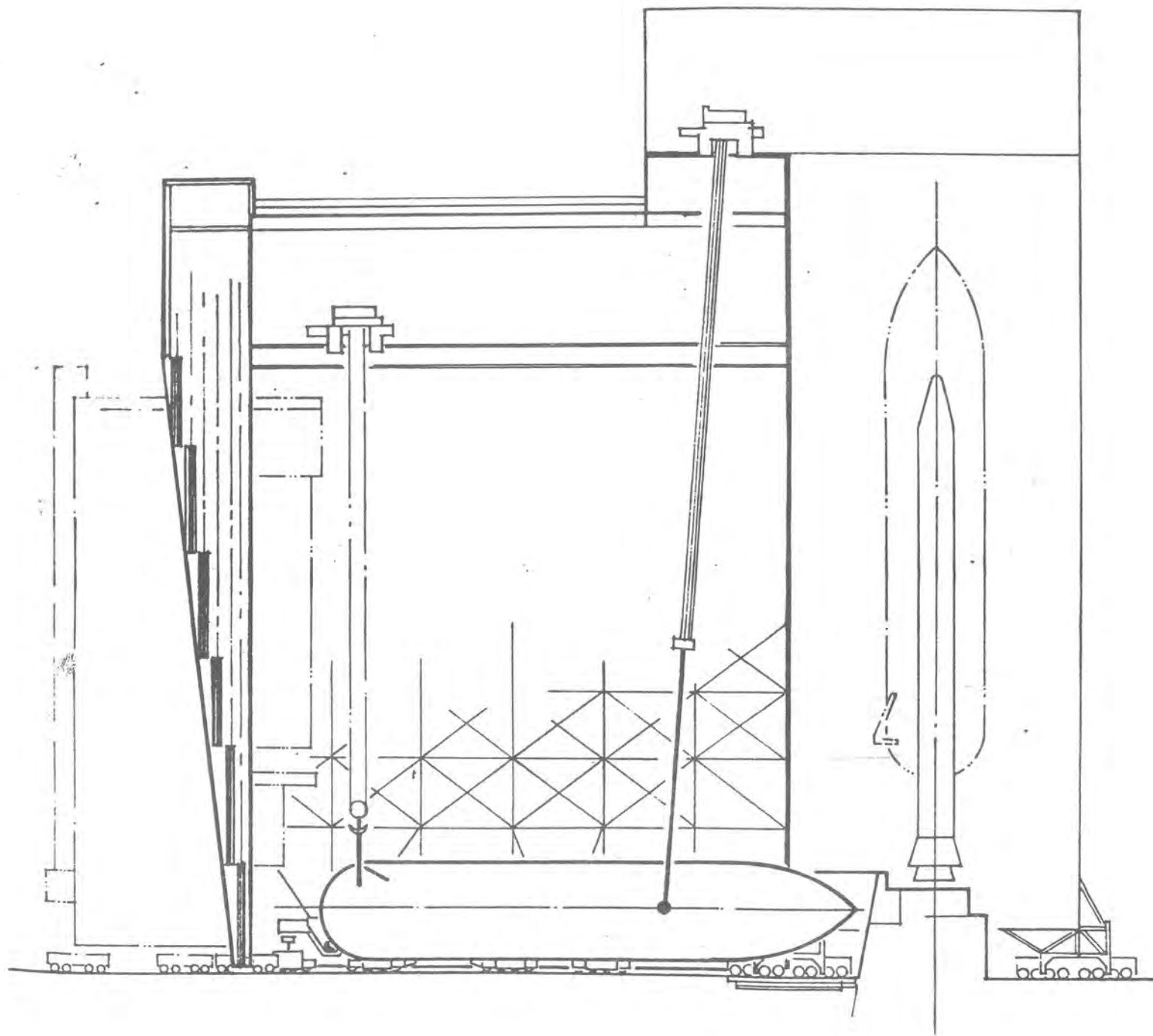


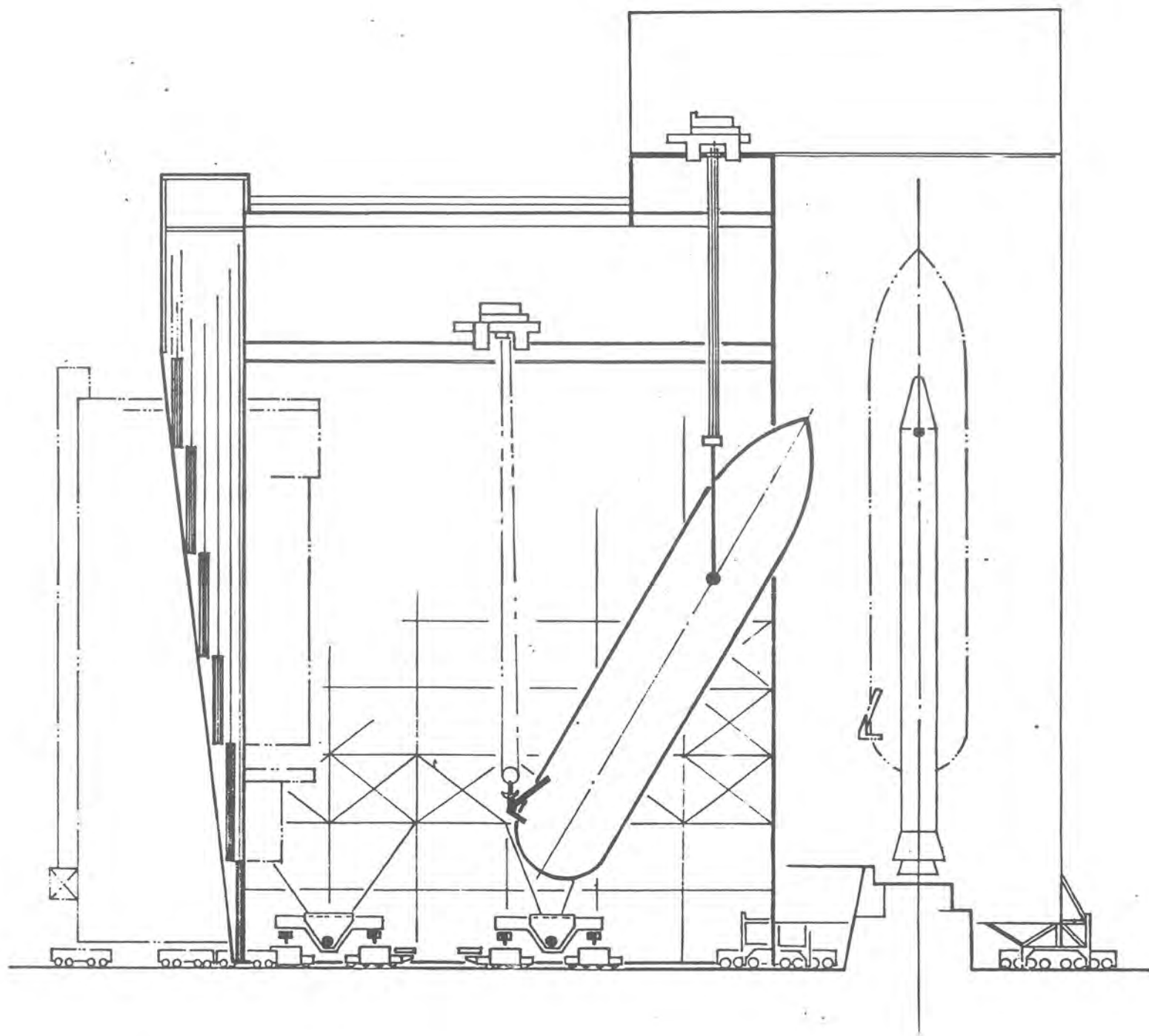


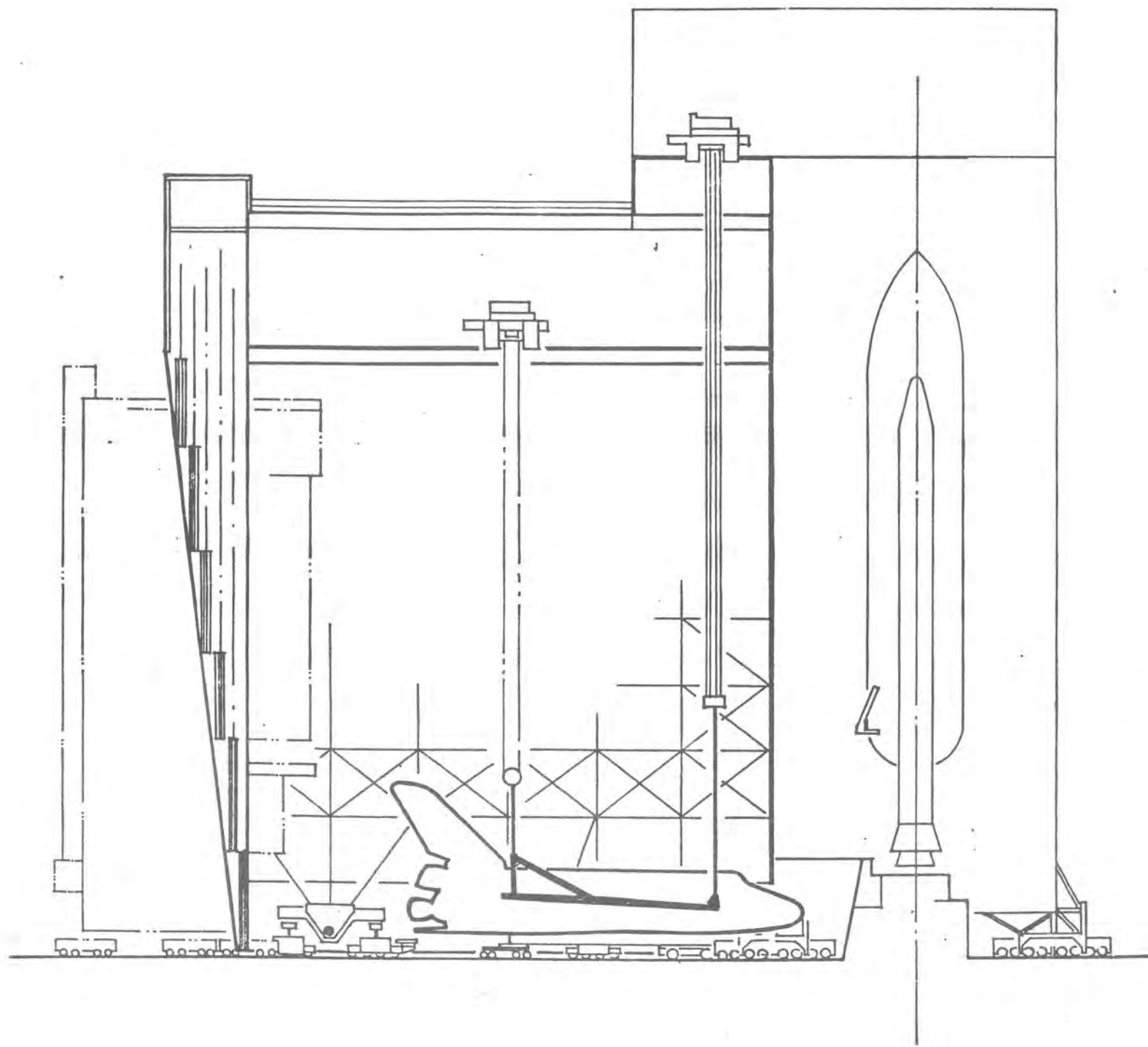
PAYLOAD CHANGEOUT ROOM, STATION SET V23

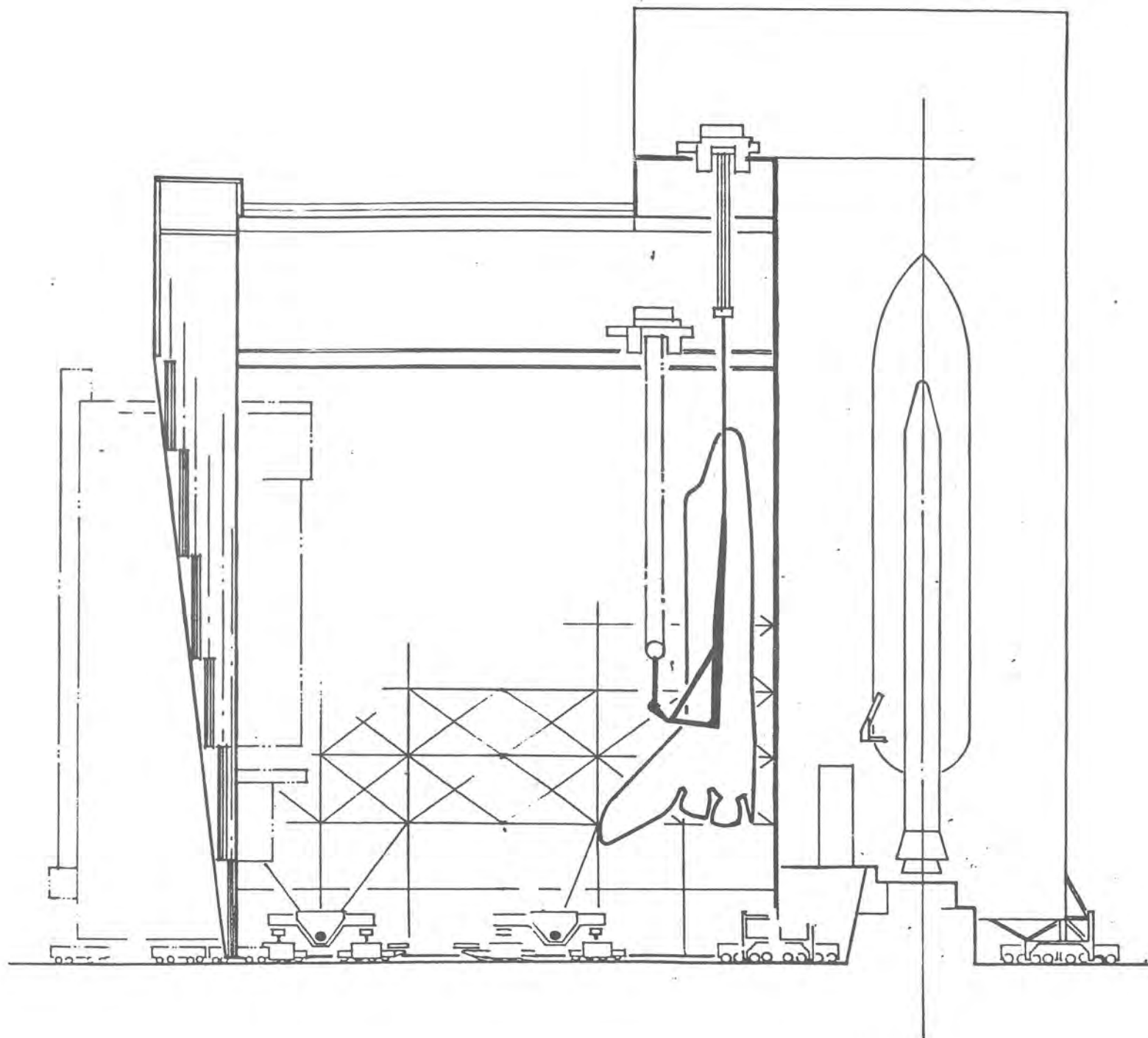
SRB STACKING AND ALIGNMENT

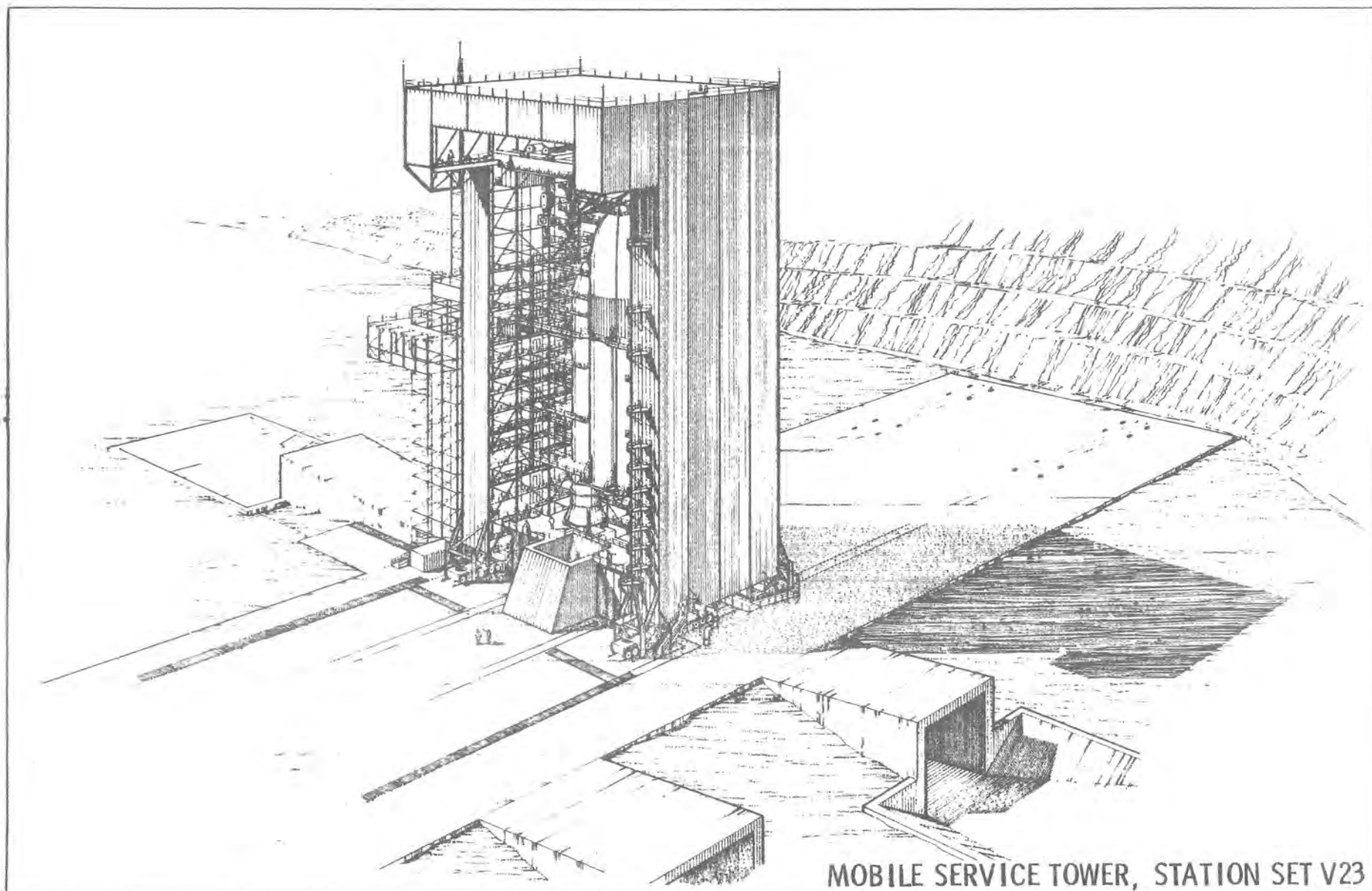






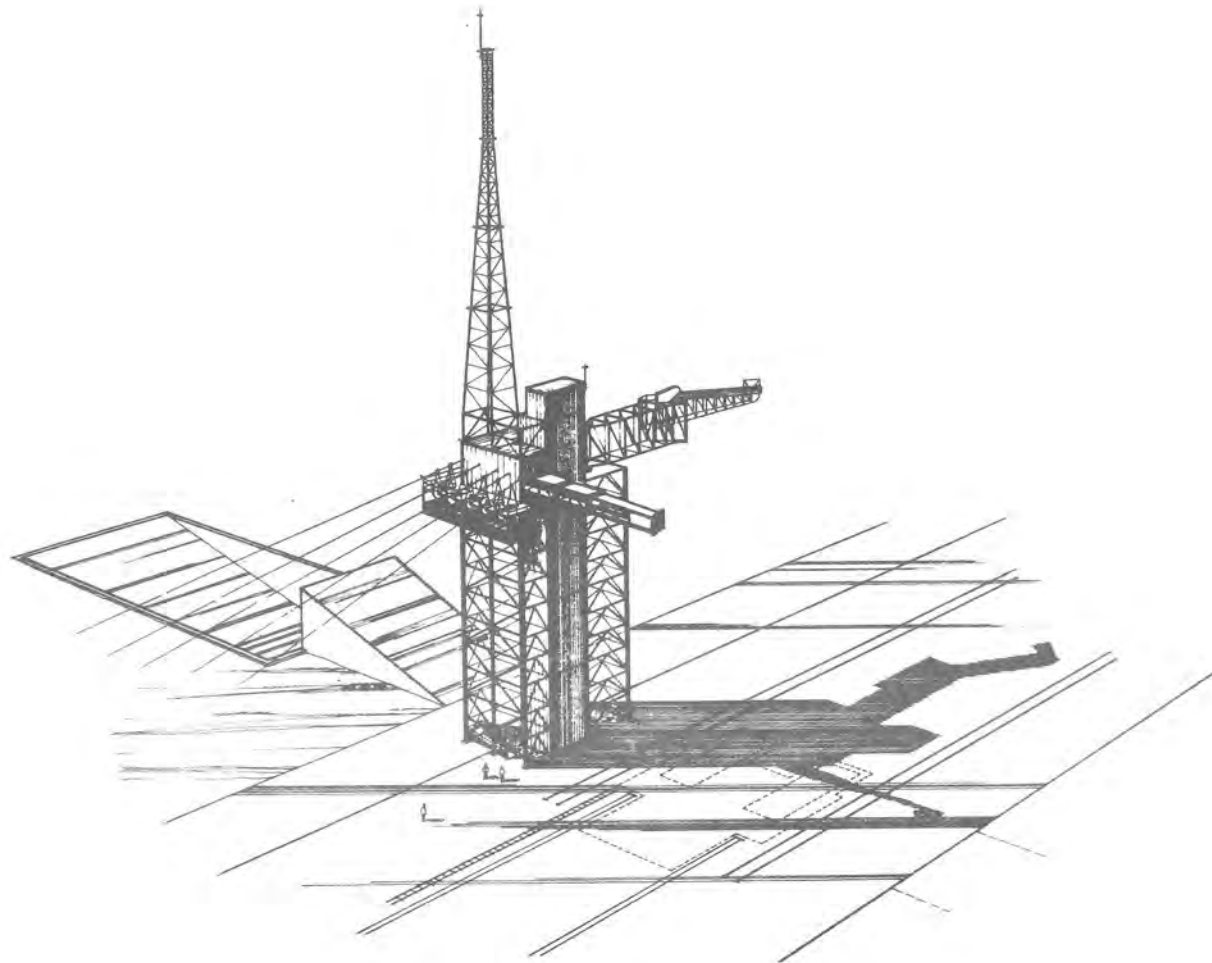




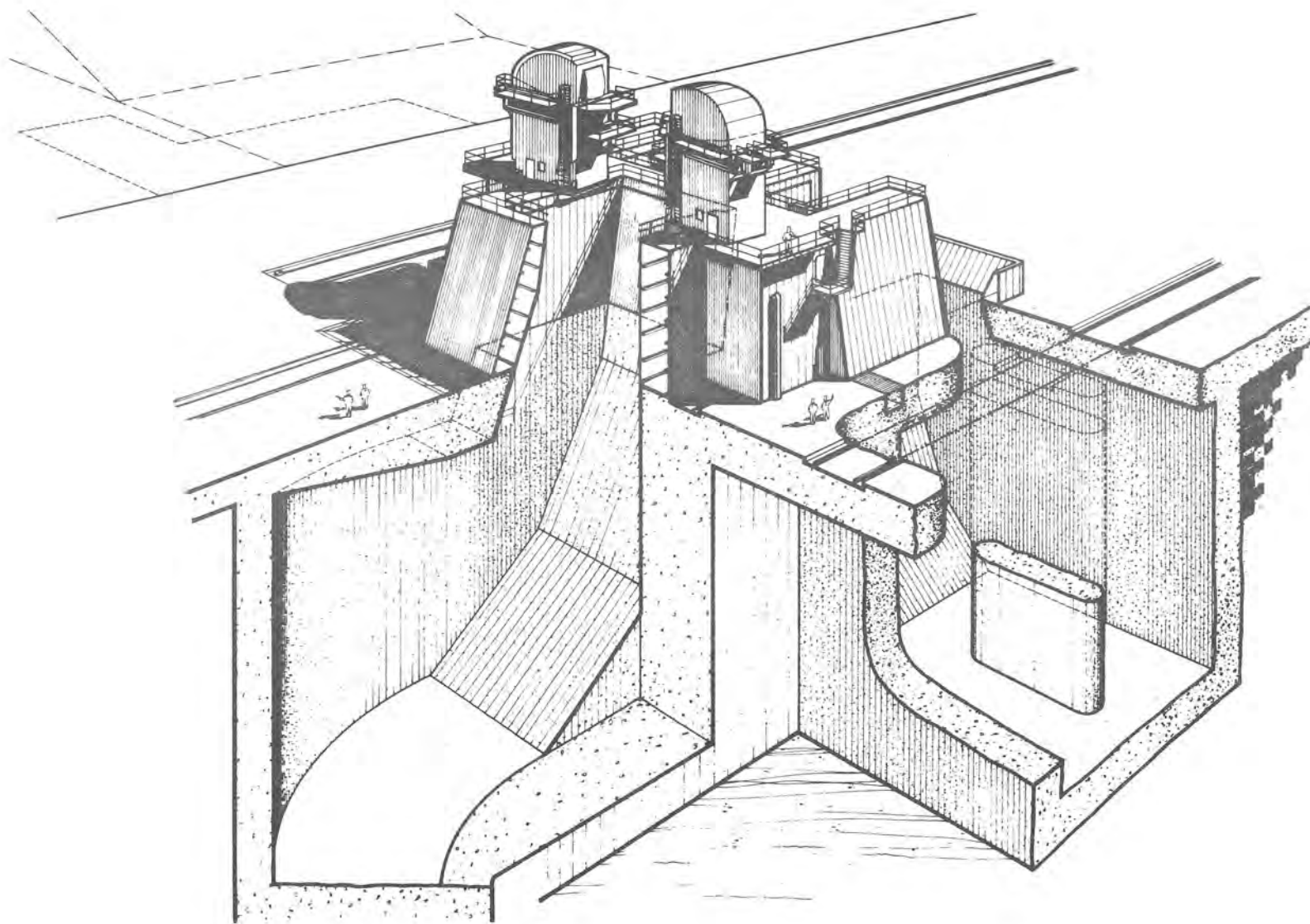


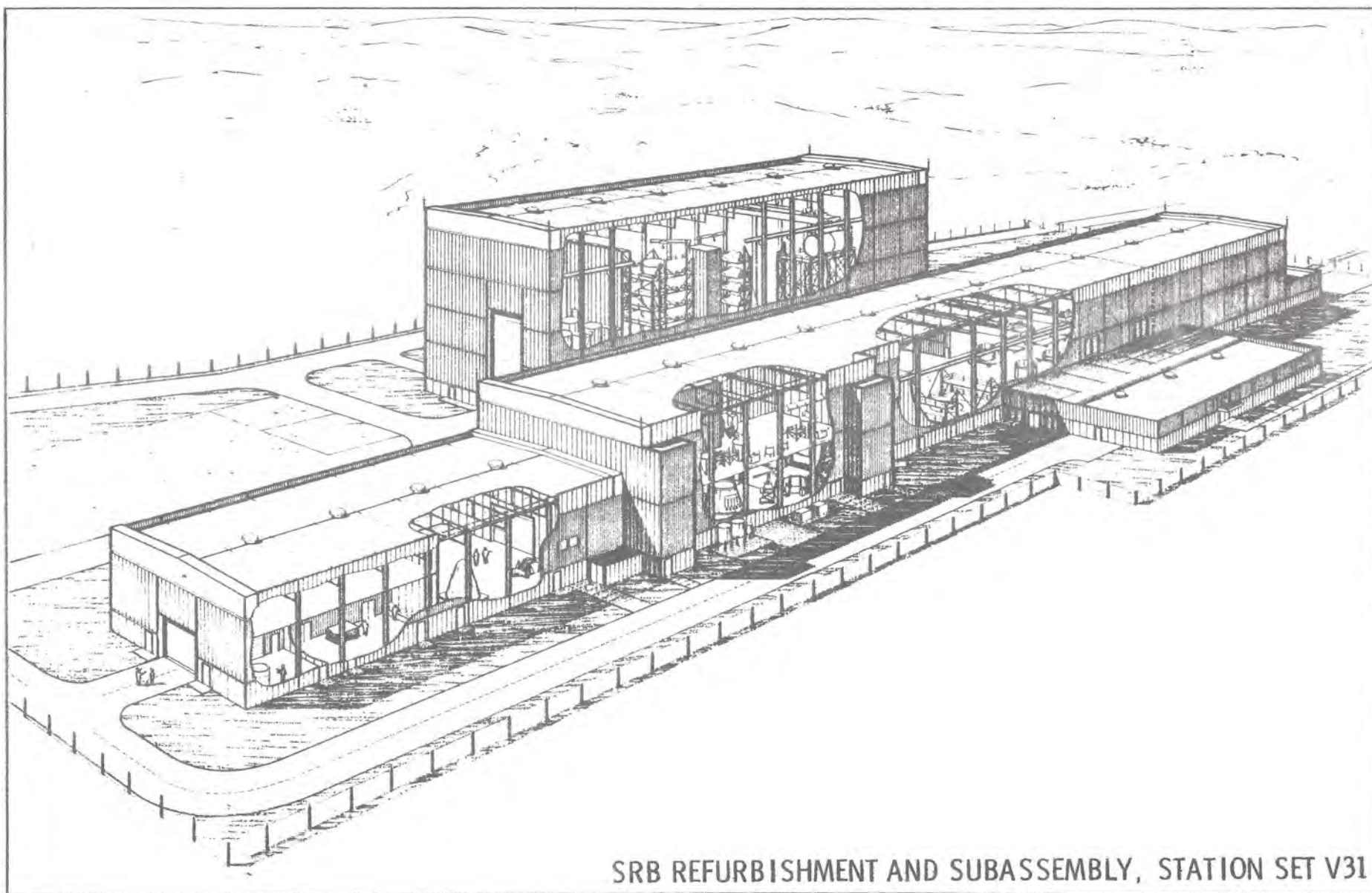
MOBILE SERVICE TOWER, STATION SET V23

ACCESS TOWER, V23

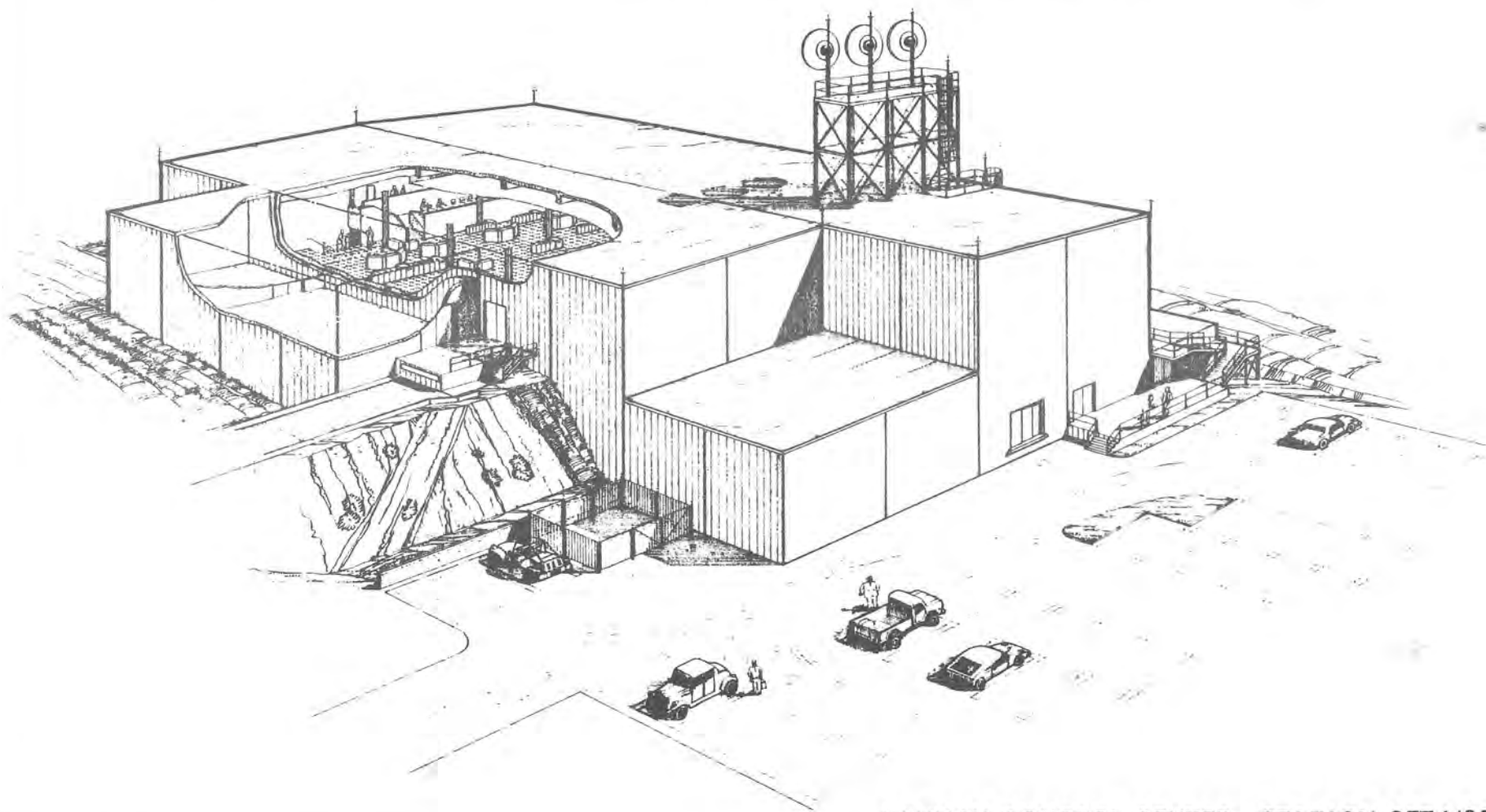


LAUNCH MOUNT, STATION SET V23



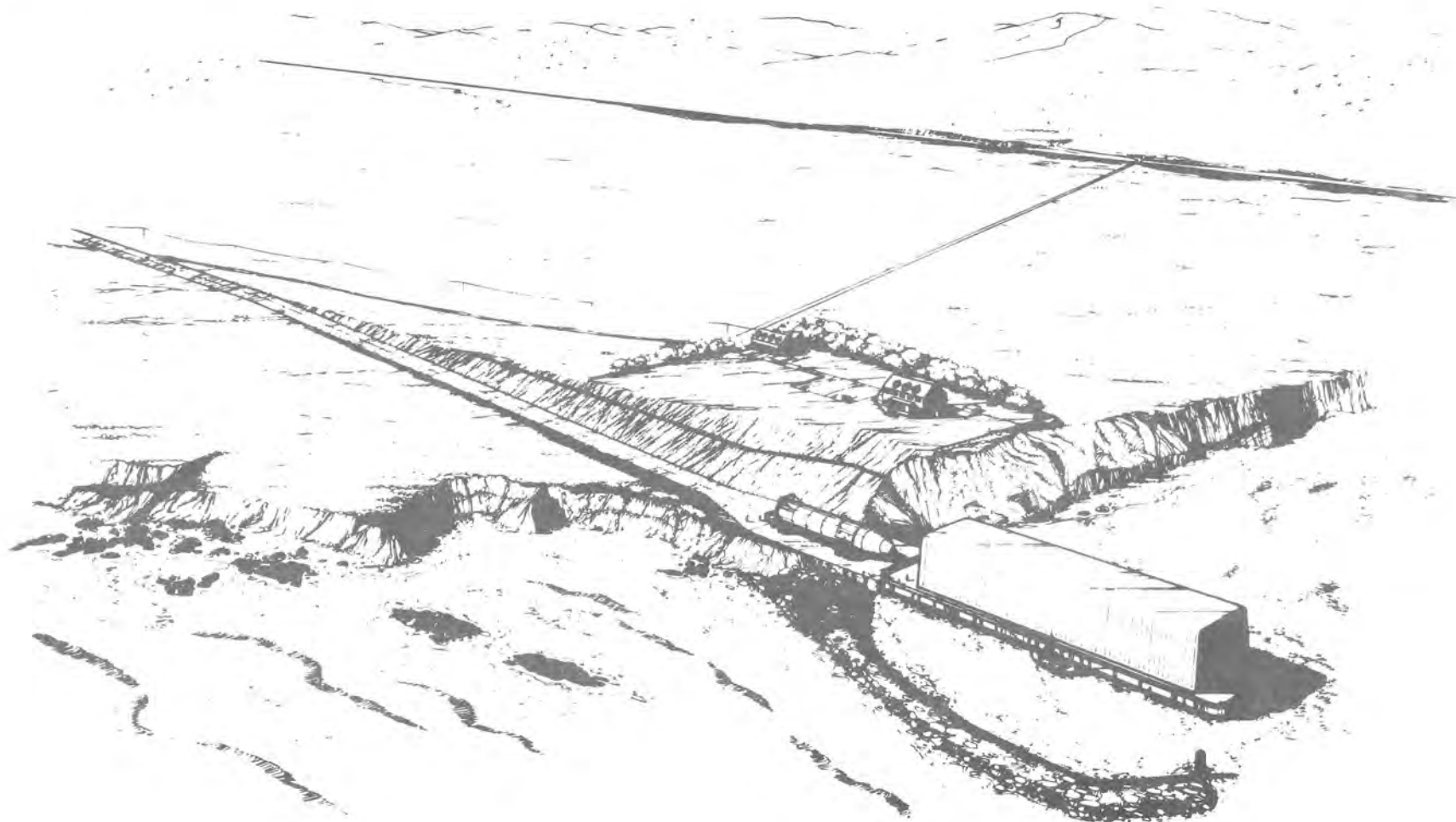


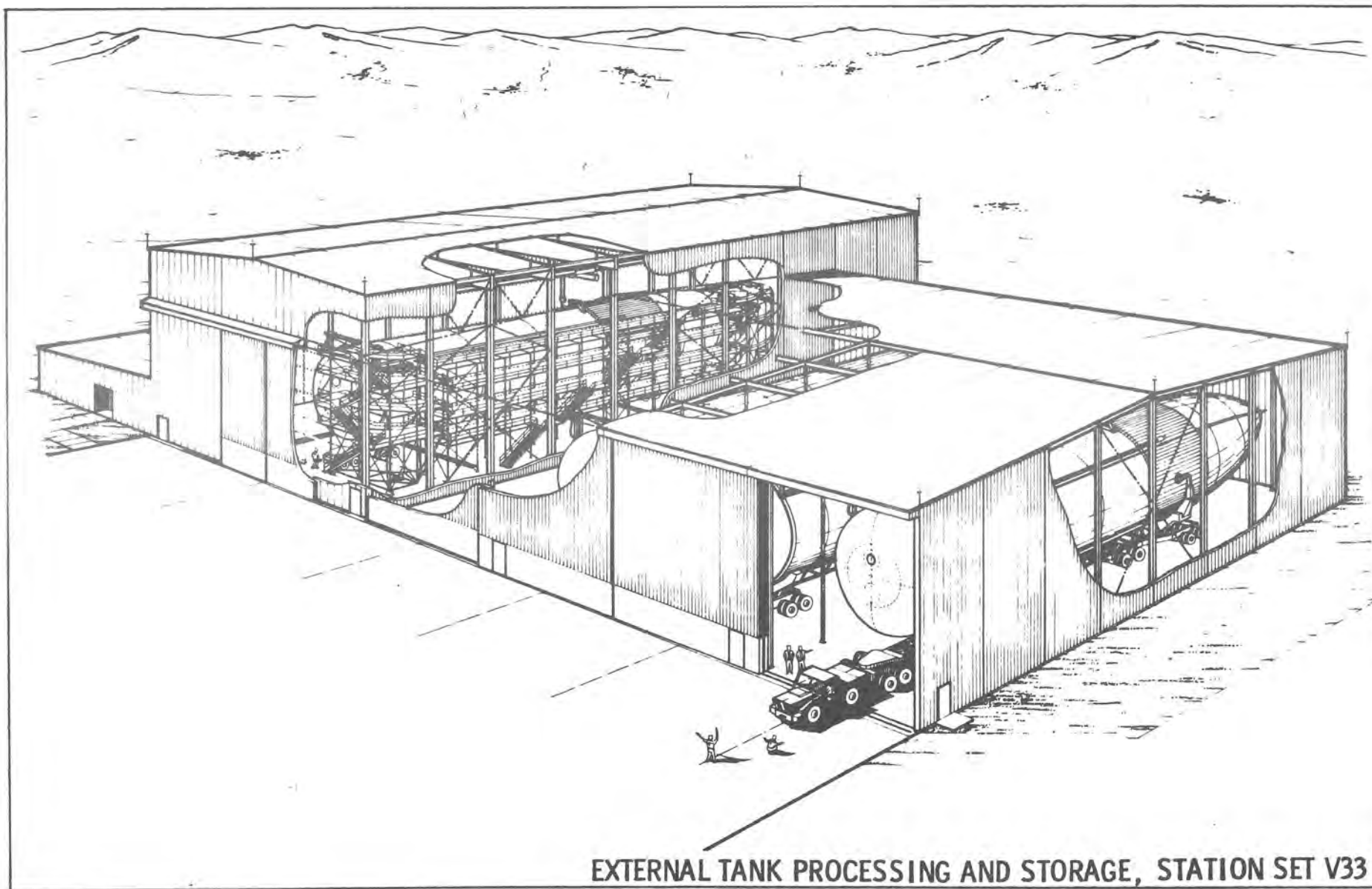
SRB REFURBISHMENT AND SUBASSEMBLY, STATION SET V31



LAUNCH CONTROL CENTER, STATION SET V28

EXTERNAL TANK DELIVERY



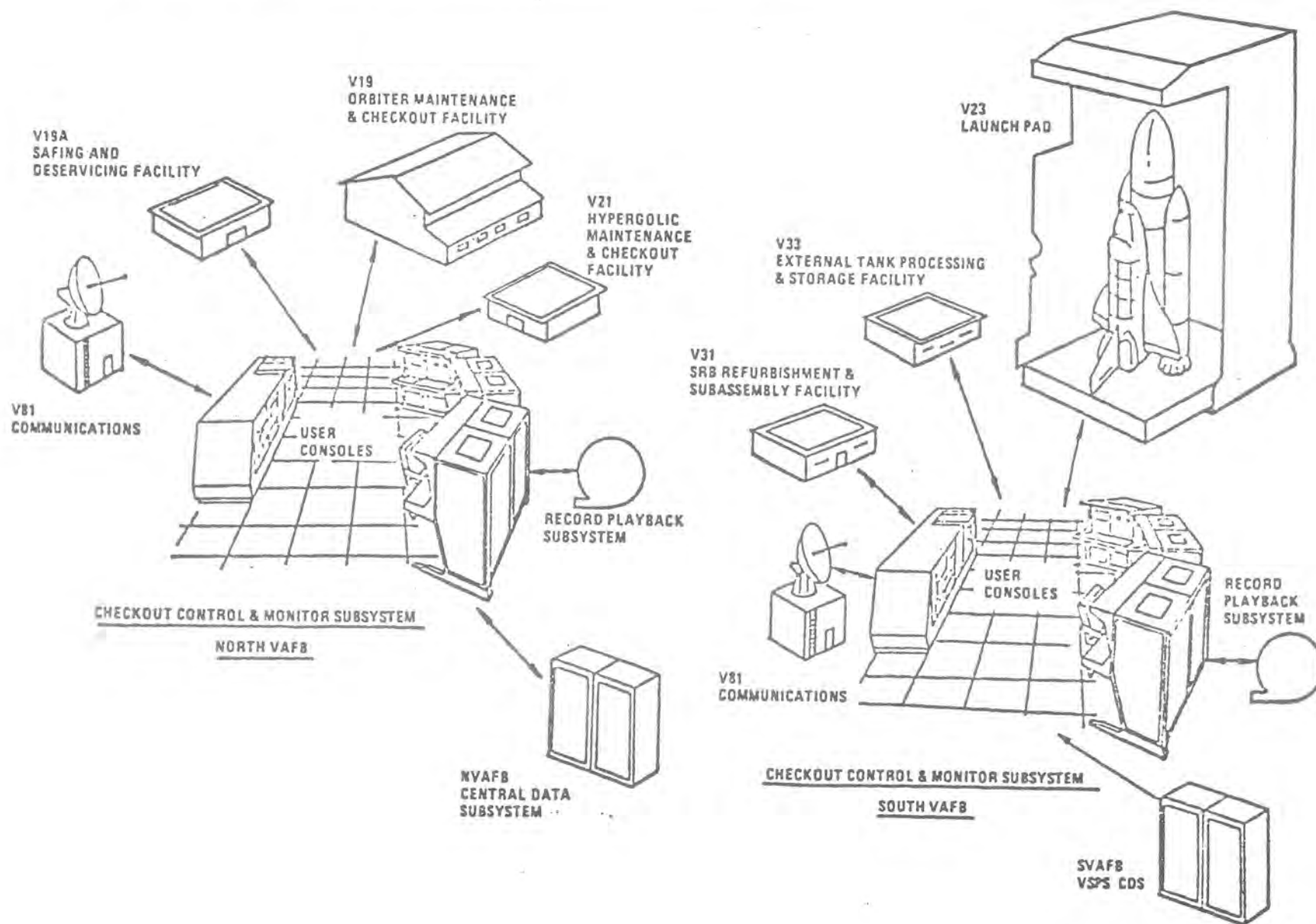


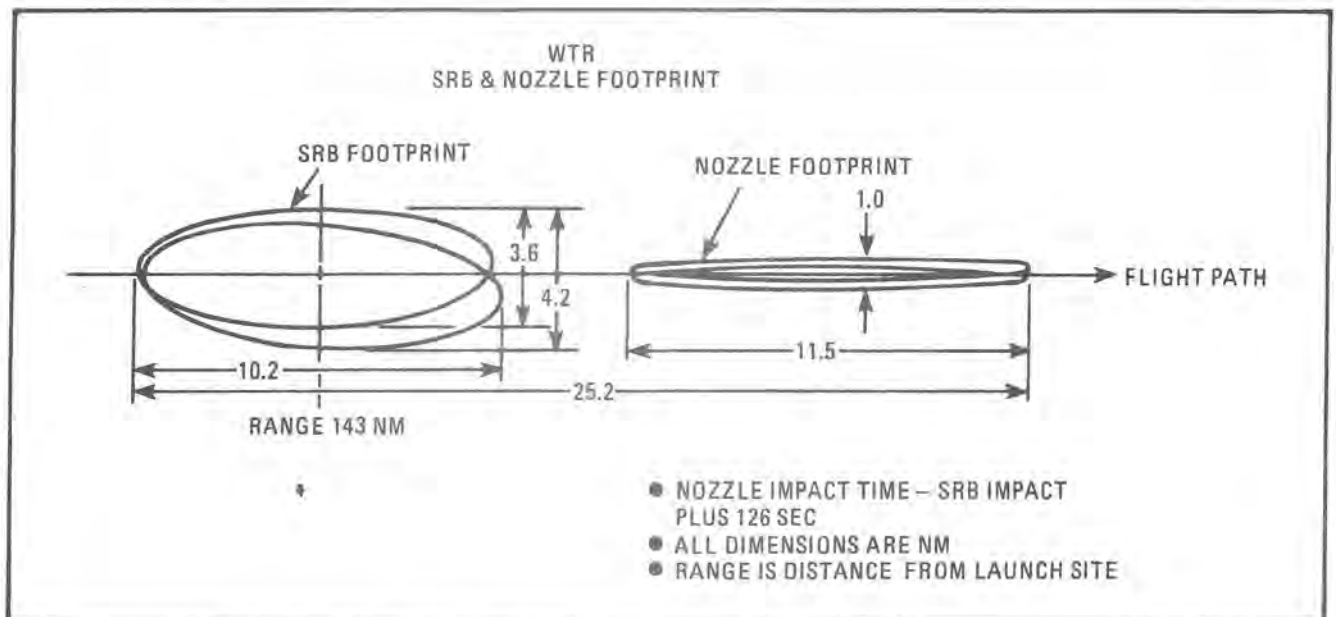
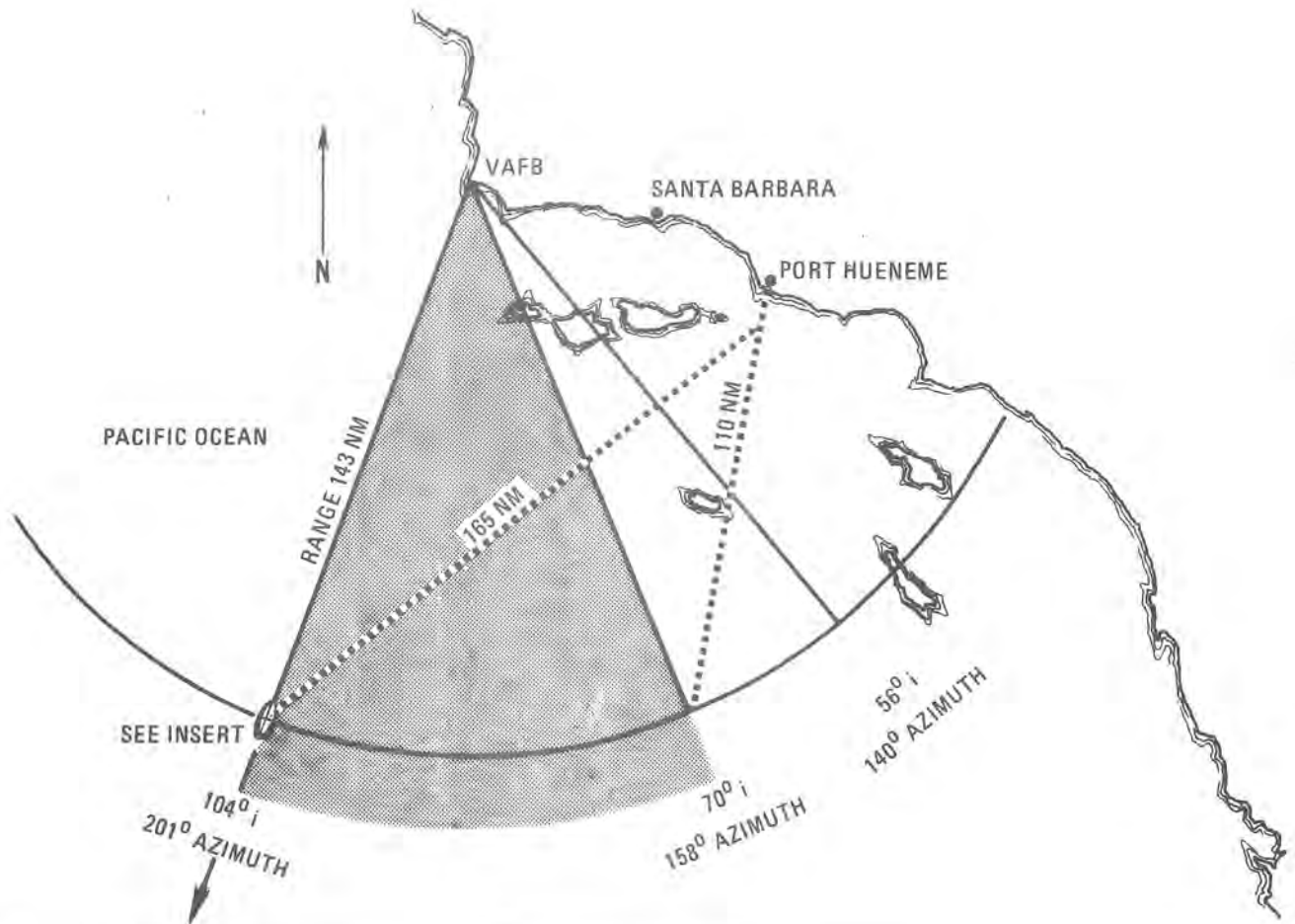
EXTERNAL TANK PROCESSING AND STORAGE, STATION SET V33



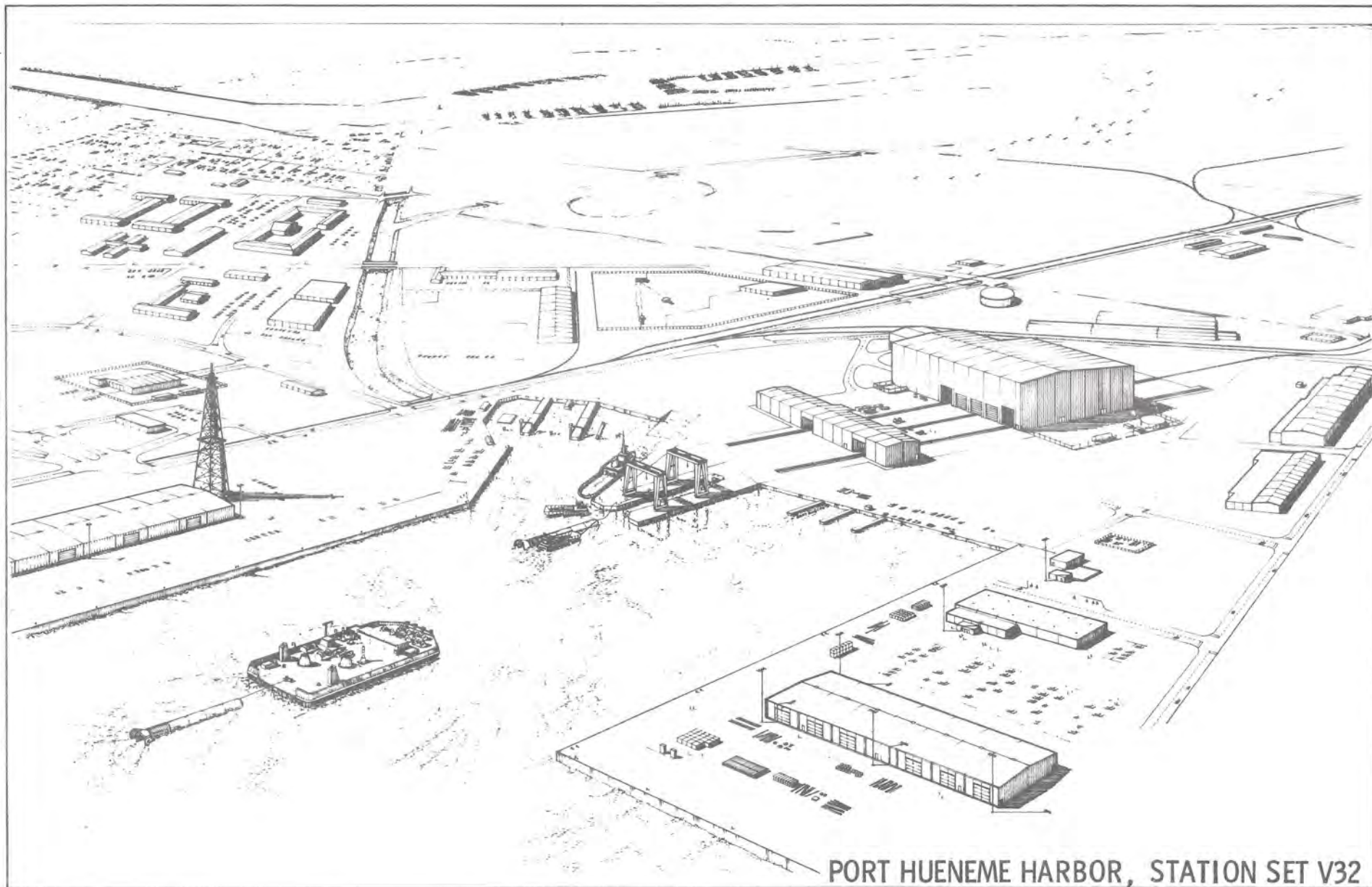
SVAFB MATERIAL SERVICE CENTER - STATION SET V88

VLPS SUPPORT OF VAFB STATION SETS

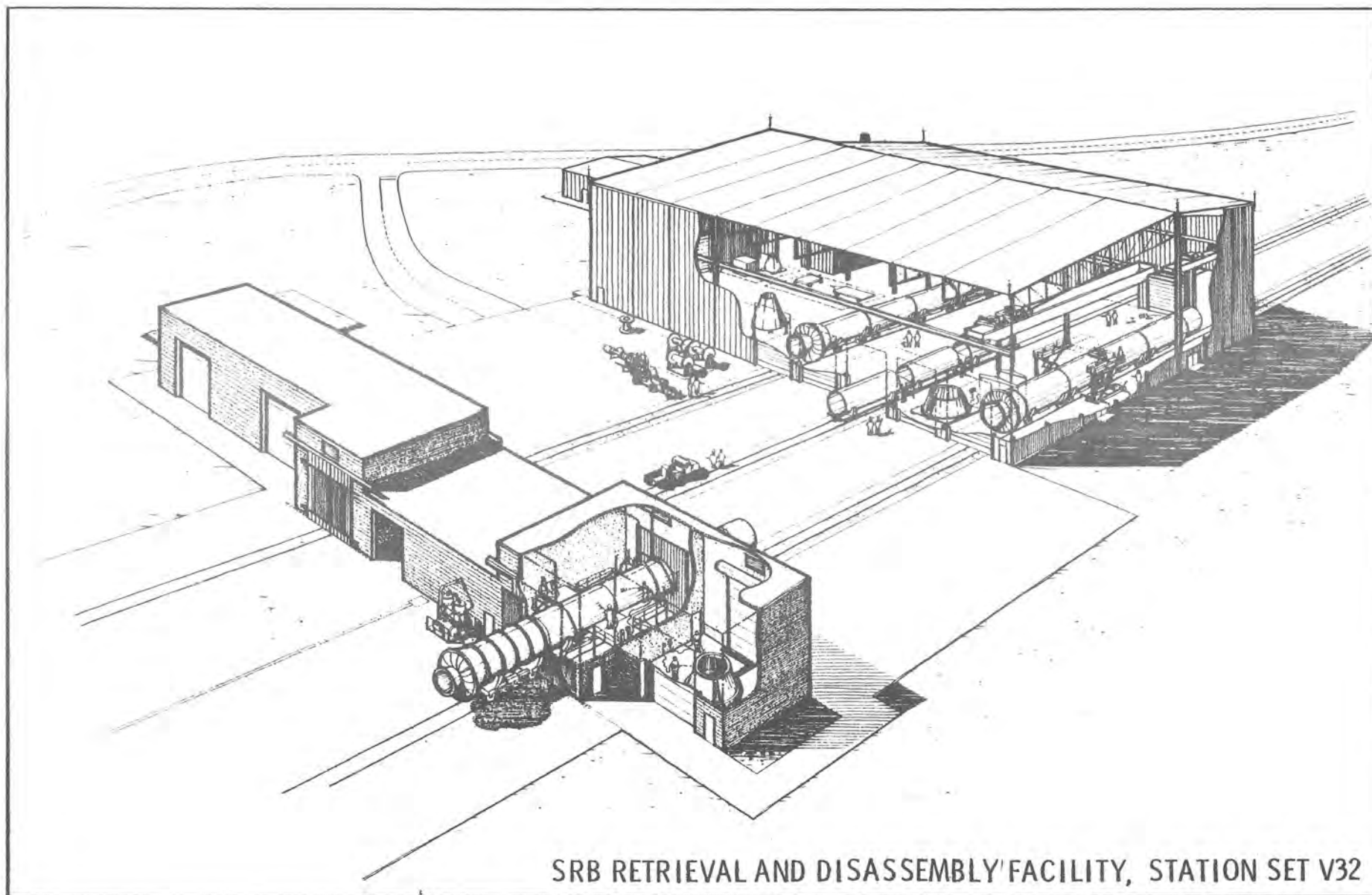




Typical SRB Impact Area (Footprint)



PORT HUENEME HARBOR, STATION SET V32



SRB RETRIEVAL AND DISASSEMBLY FACILITY, STATION SET V32

